

حمل الآن

مجاناً وحصرياً

المراجعة رقم (1)

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What is meant by ?

Positive ion (cation)	It is a metal atom that has lost one or more electrons.
Negative ion (anion)	It is a nonmetal atom that has gained one or more electrons.
Ionic bonding	It is the electrostatic attraction between a positive ion (cation) and a negative ion (anion) forming an ionic compound molecule.
Covalent bonding	It is a bond that is formed between two atoms of the same nonmetal element or between two atoms of different nonmetal elements by sharing electrons.

Explain using Lewis dot structures how each of the following is bonded, mentioning the type of bonding: ?

- ① Sodium atom $^{23}_{11}\text{Na}$ with chlorine atom $^{35}_{17}\text{Cl}$ to form a sodium chloride molecule.



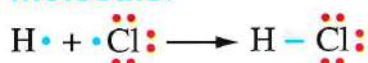
* Ionic bonding.

- ② Oxygen atom ^8O with calcium atom $^{20}_{20}\text{Ca}$ to form a calcium oxide molecule.



* Ionic bonding.

- ③ Hydrogen atom ^1H with chlorine atom $^{35}_{17}\text{Cl}$ to form a hydrogen chloride HCl molecule.



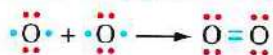
* Covalent bonding (single covalent bond).

- ④ Two hydrogen atoms ^1H to form a hydrogen molecule.



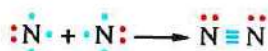
* Covalent bonding (single covalent bond).

5 Two oxygen atoms ${}_8\text{O}$ to form an oxygen molecule.



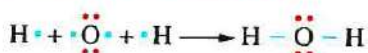
* Covalent bonding (double covalent bond).

6 Two nitrogen atoms ${}_7\text{N}$ to form a nitrogen molecule.



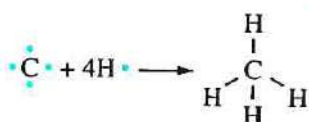
* Covalent bonding (triple covalent bond).

7 Two hydrogen atoms ${}_1\text{H}$ with oxygen atom ${}_8\text{O}$ to form a water molecule.



* Covalent bonding (two single covalent bonds).

8 4 hydrogen atoms ${}_1\text{H}$ with carbon atom ${}_6\text{C}$ to form a methane molecule.



* Covalent bonding (four single covalent bonds).

Give reason



1 The stability of noble (inert) gases atoms based on their electron configuration.

Because the outermost energy level of their atoms is complete with electrons.

2 * Nonmetal atoms tend to gain or share electrons to form chemical bonds.

* Metallic element atoms tend to lose their valence electrons.

To reach the stable electron configuration of the nearest noble gas in the atomic number.

3 A magnesium ion carries two positive charges.

Because in magnesium ion the number of positive protons is greater than the number of negative electrons by 2

4 A nonmetal atom turns into a negative ion when it gains one or more electrons.

Because the number of negative electrons becomes greater than the number of positive protons by the number of electrons that atom has gained.

- 5 **The bond between a potassium atom $_{19}\text{K}$ and a chlorine atom $_{17}\text{Cl}$ is an ionic bond.**

Because the potassium atom tends to lose the electron of its outermost energy level and changes into a positive ion, while the chlorine atom gains this electron and changes into a negative ion so, an electrostatic attraction occurs between the two ions forming an ionic compound.

- 6 **The number of electrons in the ion of each of fluorine $_{9}\text{F}$ and sodium $_{11}\text{Na}$ in sodium fluoride molecule is equal.**

Because the fluorine atom tends to gain an electron and turns into a negative ion, while the sodium atom tends to lose its valence electron and turns into a positive ion so, the number of electrons in each of them is equal (10 electrons).

- 7 **The ionic compound is electrically neutral.**

Because in the ionic compound, the number of positive charges is equal to the number of negative charges.

- 8 **Sodium and magnesium cannot combine together to form a compound molecule.**

Because both are metals, whose atoms tend to lose their valence electrons and form positive ion, so there is no electrostatic attraction occurs between them.

- 9 **The bond in a water molecule is a single covalent bond.**

Because the oxygen atom shares its two unpaired valence electrons, while each hydrogen atom shares its valence electron to form one single covalent bond between each hydrogen atom and the oxygen atom.

- 10 **The bond in a nitrogen molecule N_2 is a triple covalent bond.**

Because each nitrogen atom shares its three unpaired valence electrons to form three pairs of electrons forming one triple covalent bond.

- 11 **Ionic bonding results in formation of compound molecules only, while covalent bonding results in formation of compound molecules or element molecules.**

Because the ionic bonding occurs between atoms of different elements as a result of the electrostatic attraction between a cation of a metal element and an anion of a nonmetal element, while covalent bonding can occur between two atoms of the same nonmetal element forming an element molecule or between two atoms of different nonmetal elements forming a compound molecule.

12 Carbon atom is characterized by unique properties as a basic element in organic compounds.

Due to their ability to bond with each other in organic compounds in a form of straight chains, branched chains or cyclic structure.

What happens when ?

1 Calcium atom ${}_{20}\text{Ca}$ loses its valence electrons.

It turns into a Ca^{2+} ion that carries two positive charges.

2 A nonmetal atom gains one or more electrons.

It changes into a negative ion carrying a number of negative charges equal to the number of gained electrons.

3 Two oxygen atoms bond together.

Each oxygen atom shares its two unpaired valence electrons to form two pairs of electrons forming one double covalent bond between them.

4 A chlorine atom ${}_{17}\text{Cl}$ bonds to a hydrogen atom ${}_{1}\text{H}$

The chlorine atom shares its single valence electron with the valence electron of the hydrogen atom forming one single covalent bond between them.

5 Adding caustic soda solution to each of sodium chloride solution and hydrogen chloride solution.

Sodium chloride solution will not react with caustic soda solution, while hydrogen chloride solution will react with it.

Compare between ?

1	The atom	The ion
	Electrically neutral.	Positively or negatively electric charged.
	In the atom, the number of electrons is equal to the number of protons.	In the ion, the number of electrons is not equal to the number of protons.
	Its outermost energy level is not complete with electrons, except the atoms of the noble gases.	Its outermost energy level is complete with electrons.

2 Positive ion (cation)	Negative ion (anion)
A metal atom that has lost one or more electrons.	A nonmetal atom that has gained one or more electrons.
In the positive ion, the number of electrons is less than the number of protons.	In the negative ion, the number of electrons is greater than the number of protons.
It carries a number of positive charges equal to the number of lost electrons.	It carries a number of negative charges equal to the number of gained electrons.
The number of energy levels in the positive ion is less than the number of energy levels in its atom.	The number of energy levels in the negative ion is equal to the number of energy levels in its atom.
Its electron configuration is similar to the electron configuration of the nearest inert gas that precedes it in the periodic table.	Its electron configuration is similar to the electron configuration of the nearest inert gas that follows it in the periodic table.

3 Properties of ionic compounds	Properties of covalent compounds
Most of them dissolve in water.	Most of them do not dissolve in water
Their aqueous solutions and their molten conduct electricity.	They do not conduct electricity.
Their melting and boiling points are high.	Their melting and boiling points are low.

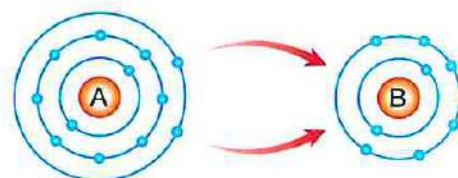
4 Ionic bonding	Covalent bonding
It occurs between a positive ion of a metal atom and a negative ion of a nonmetal atom.	It occurs between two atoms of the same nonmetal element or between two atoms of different nonmetal elements.
It occurs by losing and gaining of electrons.	It occurs by sharing electrons without gaining or losing.
It cannot occur between two atoms of the same element.	It can occur between two atoms of the same element (nonmetal).

It occurs as a result of electrostatic attraction between a positive ion (cation) and a negative ion (anion).	It occurs through the sharing of each bonded atom with one or more unpaired valence electrons.
It results in compound molecules only (such as NaCl).	It results in element molecules (such as H ₂) or compound molecules (such as HCl).

5 Points of comparison	Sodium chloride	Hydrogen chloride
Type of compound (type of bond)	Ionic compound (ionic bond)	Covalent compound (single covalent bond)
Bonding in the molecule	It is formed due to electrostatic attraction between the sodium cation Na ⁺ and the chloride anion Cl ⁻	It is formed due to sharing an unpaired valence electron from chlorine atom Cl with an unpaired valence electron from hydrogen atom H
Physical state	Solid	Gas
Melting and boiling points	High	Low
Reactivity with caustic soda (sodium hydroxide solution)	Does not react	Reacts
Molecular formula	NaCl	HCl
Lewis dot structure	[Na] ⁺ [Cl] ⁻	H – Cl

Study the following figures, then answer... ?

The opposite figure illustrates the formation of an ionic bonding between metal (A) from the alkaline earth metals group and nonmetal (B) from group (6A):

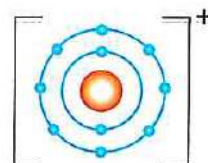


- (1) Determine the number of charges carried by each of the formed cation and anion.
- (2) Choose: Which of the following shows the molecular formula of this compound?
(AB / AB₂ / A₂B / A₂B₂)

Solution

- (1) * **Cation:** 2 positive charges. * **Anion:** 2 negative charges.
- (2) AB

The opposite figure illustrates the electron configuration of the ion of a certain element:

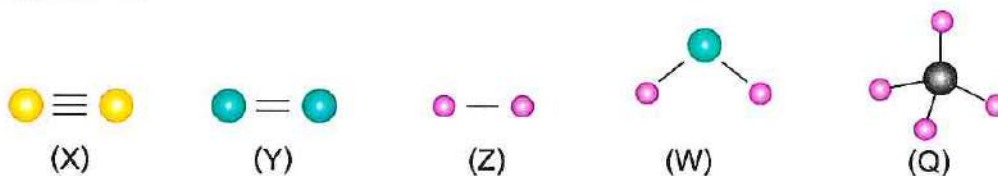


- (1) Determine the position of the element in the periodic table.
- (2) What is the number of protons in the nucleus of this ion?
- (3) What is the type of the bonding formed by the combination of this ion with the negative chloride ion?

Solution

- (1) Period 3 and group 1A (2) 11 (3) Ionic bond.

The following figures represent five molecules whose atoms are bonded by covalent bonds.



Which of the previous figures represents:

- (1) Oxygen molecule.
- (2) Hydrogen molecule.
- (3) Water molecule.
- (4) Nitrogen molecule.
- (5) Methane molecule.

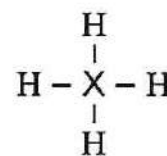
Solution

- (1) The figure (Y).
- (2) The figure (Z).
- (3) The figure (W).
- (4) The figure (X).
- (5) The figure (Q).



The following figure illustrates the bond between the atom of element (X) and four hydrogen atoms:

- (1) What is the name and symbol of element (X)?
And what are the characteristics of its atoms?
- (2) What is the group number of element (X)?
- (3) What is the type of bond in this compound?
And give reason.



Solution

- (1) * Carbon atom, represented by the symbol C
Carbon atoms are distinguished from other elements atoms by their ability to bond with each other in the organic compounds in one of the following three forms:

Straight chain	Branched chain	Cyclic structure
$\begin{array}{c} & & & \\ -\text{C} & - & \text{C} & - & \text{C} & - & \text{C}- \\ & & & \end{array}$	$\begin{array}{c} & & \\ & -\text{C}- & \\ & & \\ -\text{C} & - & \text{C} & - & \text{C}- \\ & & \end{array}$	$\begin{array}{c} & \diagup & & \diagdown \\ & \text{C} & & \text{C} \\ \diagdown & & \diagup & \\ \text{C} & & \text{C} \\ \diagup & & \diagdown \\ & \text{C} & & \text{C} \end{array}$

- (2) Group (4A).
- (3) Covalent bonding (4 single covalent bonds) / Because carbon atom shares its four unpaired valence electrons, while each of the four hydrogen atoms shares its valence electron to form four single covalent bonds between each hydrogen atom and carbon atom.

Variant Questions....



Q1 Calcium element $_{20}\text{Ca}$ combines with sulphur element $_{16}\text{S}$ forming the molecule CaS . Illustrate the atom that loses electrons and the atom that gains these electrons, with determining the number of these electrons.

A Calcium atom loses two electrons to be gained by sulphur atom.

Q2 If you have the following elements: $(_{18}\text{W})$, $(_{12}\text{X})$, $(_7\text{Y})$:

- (1) What is the symbol of the ion of the element (X)?
- (2) Can two atoms of the element (W) combine together? Give reason.
- (3) What is the type of bonding between two atoms of element (Y)? Illustrate this with a Lewis structure diagram.

A (1) X^{2+}

- (2) No, because it is an inert element (the outermost energy level of its atom is completely filled with electrons).

(3) Covalent bonding / $\text{Y} \equiv \text{Y}$

Electric Forces

What is meant by ?

Charging (Electrification) by rubbing	The process of charging two uncharged objects by rubbing two objects together.
Static electricity (electrostatic)	The charges that accumulate on the surfaces of objects when they lose or gain electrons.
Electrostatic series	The arrangement of materials according to the easiness of losing electrons when rubbed together.
Electric field	The region of space surrounding an electric charge where its effect appears.
Electric field lines electric force lines	Imaginary lines that show the path taken by a small free-moving positive charge placed in an electric field.
Charging (Electrification) by contact	The process of charging an uncharged object by contact with a charged object.

Mention the most important works of the scientist ?

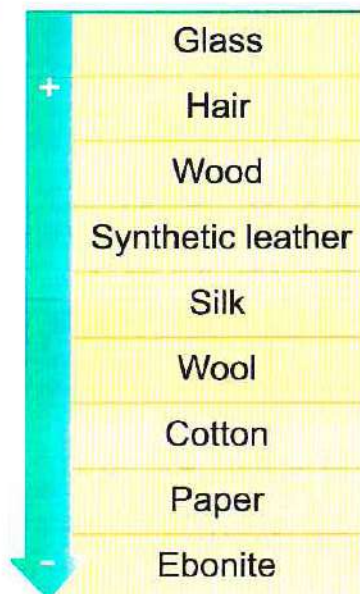
Charles Augustin de Coulomb	- Established the law that describes the electric forces between charged particles is called Coulomb's Law (the inverse square law). - His studies and discoveries in the late 18th century formed the basis for the development of electromagnetic theory.
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Mention the life applications of ?

Attraction of different electric charges	• Electrostatic coating, where the object to be coated is charged with a negative electric charge, while the paint spray is charged with a positive electric charge.
Discharge of electrostatic charges	• A metal chain hanging down to the ground from a fuel transport truck. • Lightning rod, which consists of a metallic rod with its lower end fixed in a metal plate buried in the ground and its upper end pointed, allowing accumulated charges from clouds to pass to the ground.

Remember that ?

The materials of the electrostatic series in order are:



The Electrostatic series

When one material is rubbed with another, then:

The material **higher** on the series → A positively charged.

The material **lower** on the series → A negatively charged.

Mention the importance [the use] of each of the following... ?

Coulomb meter	It is used to measure weak electrical charges and its measuring unit is coulomb.
Electrostatic coating (Electroplating)	* It is used for metal coating (plating), such that: - It makes the paint layer uniform. - It reduces paint waste.
Electroscope (Electric detector)	* It detects the electric state of objects. * It determines the type of charge on charged objects. * It compares the magnitude of charges on different charged objects.
Lightning rod	It is used to protect structures and buildings from lightning strikes.

Compare between ?

1 Electric conducting materials	Non-electric conducting materials (Insulators)
* Materials that allow electric charges to flow through them. * Materials on which static electric charges can settle, but the charged part must be insulated.	* Materials that do not allow electric charges to flow through them. * Materials on which electric charges settle.
Examples: * Carbon. * Metals such as iron, copper, and aluminum.	Examples: * Wood. * Glass. * Silk. * Wool.
2 Electric attraction force	Electric repulsion force
A force arises between two objects charged with different electric charges.	A force arises between two objects charged with the same electric charge.

Give reason ?

- 1 Paper scraps are attracted to a wooden rod that has been rubbed with a piece of wool.

This is due to the rod being charged with static electricity, which gives it the ability to attract light weight objects (paper scraps).

- 2 When rubbing a copper rod it must be insulated with a wooden handle.

To prevent the leakage of electric charges, as copper is one of the electrically conducting materials.

- 3 When an ebonite rod is rubbed with a piece of cotton, the cotton gains a positive charge, while the ebonite acquires a negative charge.

Because cotton precedes the ebonite in the electrostatic series, so it tends to lose electrons and becomes positively charged, while the ebonite gains these electrons and becomes negatively charged.

- 4 The type of charge generated on a dry silk piece and a glass rod differs after they are rubbed together.

Because when the glass rod is rubbed with dry silk, electrons transfer from the glass rod to the piece of silk, resulting in the glass gains a positive electric charge, while the silk gains a negative electric charge.

- 5 The type of electric charge generated on the ebonite rod differs from the type of charge generated on the glass rod after each of them is rubbed separately with a piece of silk.**

Because rubbing the ebonite rod with silk causes the ebonite to gain a negative electric charge, while rubbing the glass rod with silk causes the glass rod to gain a positive electric charge.

- 6 The same material can be charged with either a positive or negative charge.**

This depends on the type of rubbing material and its position in the electrostatic series. If it is rubbed with a material that precedes it in the series, it will be charged negatively. and if it is rubbed with a material that follows it, it will be charged positively.

- 7 Paper scraps attracted to a wooden rod after each of them is rubbed with a piece of silk.**

Because rubbing wood with silk causes the wood to gain a positive electric charge, and rubbing paper with silk causes the paper to gain a negative electric charge, and objects that carrying different charges attract each other.

- 8 Two pieces of silk repel each other after being rubbed separately with a piece of cotton.**

Because rubbing silk with cotton causes the silk to gain a positive electric charge, and objects that are charged with the same charge repel each other.

- 9 Touching the disk of the electroscope with your hand before starting using it.**

To ensure it is free of any electric charge.

- 10 The gold leaves of the electroscope diverge when a charged object touches the disc of the electroscope.**

Because the leaves of the electroscope are charged with the same charge of the object and similar charges repel, causing the electroscope's leaves diverge.

- 11 The divergence of the leaves of the positively charged electroscope increases when a glass rod rubbed with a piece of silk is brought near the electroscope's disk.**

Because rubbing glass with silk causes the glass rod to gain a positive electric charge which is similar to that of the charged electroscope, so the divergence of its leaves increases.

- 12 The divergence of the charged electroscope's leaves with a positive charge decreases when an ebonite rod rubbed with wool is brought near the electroscope's disk.**

Because the ebonite rod gains a negative charge when rubbed with wool, and therefore the divergence of the two leaves decreases due to the difference in charge of the rod and the charge of the leaves.

- 13 You feel a slight electric shock when touching a metal door handle after walking barefoot on the carpet.**

Because when you touch the handle, the charge that formed on the body due to friction with the carpet is discharged.

- 14 Hearing a crackling sound when taking off woolen clothes in winter.**

Because during friction between the body and the woolen clothing, there is a discharge of the electric charges that have accumulated on the body.

- 15 Metal chains are suspended from fuel transport trucks, touching the ground.**

To discharge the electric charges generated from the friction of the fuel with the surface of the fuel tank to prevent fuel combustion.

What are the consequences of ?

- 1 Rubbing two different uncharged insulated objects together.**

Only the rubbed part is charged with static electricity.

- 2 Rubbing a wooden rod with a piece of cotton.**

Cotton gains a negative electric charge, while wood gains a positive electric charge.

- 3 Bringing an ebonite rod near another ebonite rod that is freely suspended after each of them has been rubbed with a piece of silk.**

The ebonite rod moves away (repels) from the fixed rod.

- 4 Bringing a glass rod near a freely suspended ebonite rod after each of them has been rubbed with a piece of cotton cloth.**

The ebonite rod and the glass rod attract each other.

- 5 Charge both the object to be coated and the spray paint with the same charge during the electrostatic coating process.**

The paint spray repels from the surface to be coated and does not settle to it.

- 6 Touching a charged object to the disk of an electroscope.**

The leaves of the electroscope diverge (spread a part).

- 7 Touching an uncharged object to the disk of an electroscope.**

The leaves of the electroscope are not affected and remain closed.

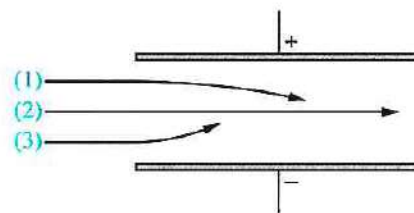
- 8 Bringing an object charged with a negative electric charge closer to an electroscope charged with a negative charge.**

The divergence of the leaves of the electroscope increases.

Study the following figures, then answer ?

The opposite figure represents the path of three beams of subatomic particles in an electric field:

Identify the type of each beam, and give reason



Solution

Beam (1): Represents protons / because they have a positive charge and opposite charges attract.

Beam (2): Represents neutrons / because they are neutrally charged.

Beam (3): Represents electrons / because they have a negative charge and opposite charges attract.

The opposite figure illustrates three cases for the leaves of an electroscope.

Determine what happened in steps (1) and (2).



Solution

* **In step (1):** The electroscope's disc was touched with a negatively charged object, causing the two leaves of the electric detector to diverge and become negatively charged.

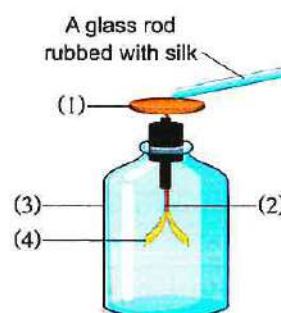
* **In step (2):** A negatively charged object was brought closer to the electroscope's disc, resulting in increasing the divergence of the electric detector's leaves.

The opposite figure shows a glass rod rubbed with a piece of silk touching part (1):

(1) What is the name of the device shown in the figure ?

(2) Identify the type of materials (1): (4).

(3) Determine the type of charge formed on part (4).



Solution

(1) The electroscope (electric detector).

(2) * (1): A copper disk.

* (2): A copper rod.

* (3): A glass container.

* (4): Two gold leaves

(3) Positive charge / because when the electric detector touches a charged object (rod made of glass), the leaves of the detector become charged with the same type of charge as the object detector's leaves.

Variant questions ?

Q1 Material (X) gains a negative charge when rubbed with a piece of material (Y), while it gains a positive charge when rubbed with a piece of material (Z).

- (1) Based on what you have studied, suggest the type of each of the materials (X), (Y), and (Z).
- (2) What is expected to happen when bringing material (X) close to material (Y) before the rubbing process? With explanation.

A (1) (X): Silk. (Y): Synthetic leather. (Z): Wool.

- (2) Material (X) is not attracted to material (Y), because there is no static electric charges formed on both materials.

Q2 When an ebonite rod rubbed with a piece of silk is brought near two balls (X) and (Y) made of the same material which are freely suspended, ball (X) moved away from the rod while ball (Y) moved closer to it.

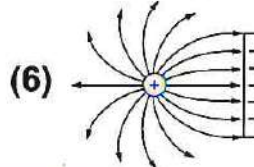
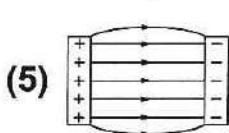
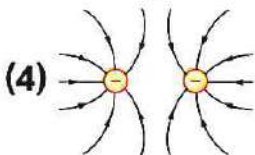
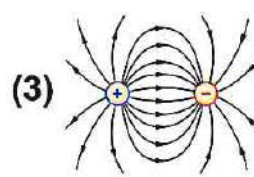
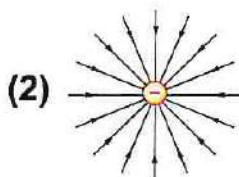
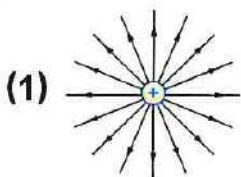
- (1) Determine the type of charge on both the ebonite rod and the ball (X).
- (2) Explain moving ball (Y) towards the ebonite rod.

A (1) The charge of both the ebonite rod and the ball (X) is negative.

- (2) Due to the difference in charge between the ebonite rod and the ball (Y), and the opposite charges attract each other.

Q3 Illustrate with a drawing the shapes of the force field lines for each of the following:

- | | |
|--|--------------------------|
| (1) One positive charge. | (2) One negative charge. |
| (3) Two different charges. | (4) Two similar charges. |
| (5) Two metal plates with different charges. | |
| (6) A charged plate and an opposite charge. | |



Q4 Identify the properties of electric force lines.

- A**
- * Imaginary lines that do not intersect with each other.
 - * They start at the positive charge and end at the negative charge.
 - * They end at the surfaces of charged metallic objects and do not penetrate them.

Magnetic Forces

What is meant by ?

Magnetic poles	The two regions on the magnet where the magnetic attraction force is at its maximum.
Compass	An old tool used to determine the Earth's four main geographical directions.
Law of attraction and repulsion	Like magnetic poles repel each other, while unlike magnetic poles attract each other.
Magnetic field	The region of space around a magnet where the effect of its magnetic force appears.
Magnetic field lines	They are imaginary lines that represent the force of the magnetic field.

Mention the importance of ?

The magnetic brush	It is used by forensic and criminal investigation experts in criminal investigations to reveal unclear fingerprints.
The compass	Used to determine the four geographical directions of Earth.

Give reason ?

① Iron and cobalt are both magnetic materials.

Because iron and cobalt are attracted to magnet.

② Not all metals are magnetic materials.

Because some metals, such as copper, gold, and silver, are not attracted to magnet.

③ The density of iron filings increases at the poles of the magnet.

Because the magnetic forces are at their maximum at the poles of the magnet.

4 Magnet always takes a certain direction when it is suspended freely.

Because Earth acts as a giant magnet, it affects the suspended magnet so, the magnet's north pole (N) of the magnet points towards the geographical north pole of Earth, while the south pole (S) of the magnet points towards the geographical south pole of Earth.

5 * The magnetic needle of the compass is placed in a copper box.

*** The compass box is not made of iron.**

To prevent the attraction between the magnetic needle and the box that may affect its movement.

6 Electric field lines and magnetic field lines are similar in some properties.

Because both are imaginary lines that do not intersect with each other.

7 The mutual force between two like charges is similar to the mutual force between two like magnetic poles.

Because both represent a force of repulsion.

What happens when



1 A magnet is divided into several parts.

Each part becomes a new magnet with a north and south pole.

2 Placing a magnet close to a mixture of copper filings, iron filings, and sand.

Only the iron filings are attracted to the magnet.

3 A magnetic brush is brought close to iron filings and then passed over a surface with unclear fingerprints.

Some iron filings stick to the traces left by fingerprints, making them visible and then helping in revealing unclear fingerprints.

4 A magnet is dipped into nickel filings.

Nickel filings are attracted to the magnet, and the density of the filings is at its maximum at the poles of the magnet and decreases at the middle of the magnet.

5 An aluminium rod is brought close to a stable compass.

The direction of the compass needle is not affected.

6 The south pole of a magnet is brought close to the north pole of another magnet that is freely suspended.

The two magnetic poles attract each other.

7 The north pole of a magnet is brought close to the north pole of another magnet that is freely suspended.

The two magnetic poles repel each other.

Compare between ?

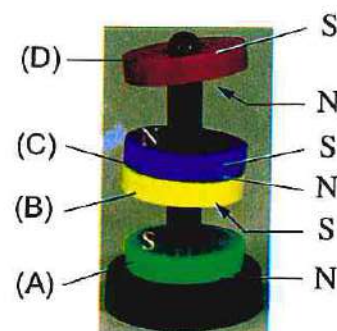
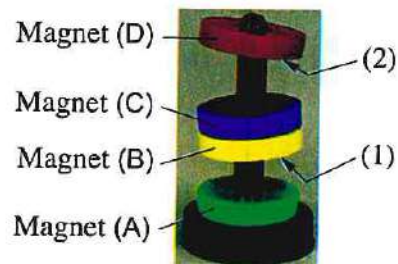
1	Magnetic materials	Non-magnetic materials
Definition	These are materials that attracted to magnets.	These are materials that are not attracted to magnets.
Examples	Nickle - Cobalt - Iron - Wrought iron.	Silver - Aluminium - Copper - Gold.

2	Electric field	Magnetic field
	The region of space surrounding an electric charge where its effect appears.	The region of space around a magnet where the effect of its magnetic force appears.
	Represented by imaginary lines called electric field lines.	Represented by imaginary lines called magnetic field lines.

3	Electric field lines	Magnetic field lines
	Imaginary lines that do not intersect each other.	Imaginary lines that do not intersect each other.
	They start from the positive charge and end at the negative charge.	They start from the north pole of the magnet and end at the south pole of the magnet.
	They end at the surfaces of charged metallic objects and do not penetrate them.	They are denser near the poles and far separated as they move away from them.

Study the following figures then answer ?

The opposite figure shows four ring magnets placed around a vertical rod. If you know that the lower pole of magnet (A) is a north pole, deduce the type of pole for each of the magnets (1) and (2).



"For illustration only"

■ Solution

- ∴ The upper pole of magnet (A) is south pole (S) and it repels pole (1) of magnet (B).
- ∴ Pole (1) of magnet (B) is also a south pole (S).
- ∴ The upper pole of magnet (C) is a north pole (N), and it repels pole (2) of magnet (D).
- ∴ Pole (2) of magnet (D) is also a north pole (N).



The opposite figure shows several magnets placed on a hand that attract paper clips towards them:

- (1) What is the material which the paper clips are likely made of ?
- (2) What do you conclude from the attraction of paper clips to magnets even though the hand is between them?

■ Solution

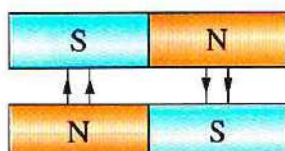
- (1) Any magnetic material that is attracted to a magnet, such as nickel, iron, cobalt, or wrought iron.
- (2) A magnet has a magnetic field that extends through the hand and affects objects at a distance with magnetic force.



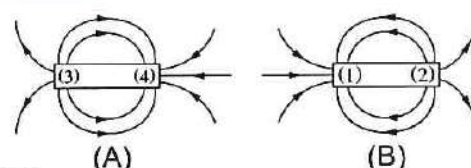
In the opposite figure, draw four straight arrows to indicate the direction of the magnetic field lines between the magnets.



Solution



The opposite figure shows the magnetic field lines of two adjacent magnets (A) and (B):



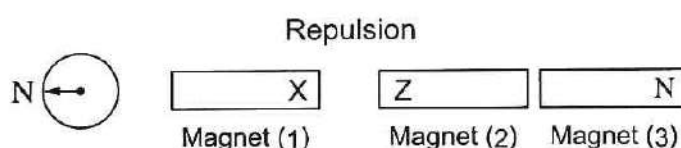
- (1) Identify the type of poles of the magnets (A) and (B).
- (2) Identify the type of force between both magnets.

Solution

- (1) The poles (2), (3) are north poles, and the poles (1), (4) are south poles.
- (2) Repulsive force.



The following figure shows three magnetic bars and a compass placed in a straight line:



- (1) Identify the type of poles (X) and (Z).
- (2) What type of force exists between the facing poles of magnet (2) and magnet (3)?

Solution

- (1) The poles (X), (Z) are south poles (S).
- (2) Attraction force.

Gravitational Forces

What is meant by ?

Earth's gravitational force	The force that pulls (attracts) all objects downward towards the center of Earth.
Earth's gravitational field	The space in which Earth's gravitational force affects material objects, with an attraction force towards the center of Earth.
Earth's gravitational field lines	Lines that represent Earth's gravitational force.
Tides	A natural phenomenon that occurs due to the gravitational force between the Moon and Earth, causing periodic changes in the elevation and recession of water in the seas and oceans.
Black Holes	Regions in space characterised by enormous gravity, formed as a result of the collapse of a massive star at the end of its life.
Orbital Motion	The revolution of any object in space around another central object in a curved path as a result of gravitational force between them.
Mass	The amount of matter in an object.
Weight	The gravitational force that Earth exerts on an object.

Notes

The gravitational force is a mutual force between two objects, acting on each of them **by equal magnitude and in opposite directions**.

Mention the importance of ?

Gravitational Force

It is responsible for:

- The occurrence of tides.
- Orbital motions.
- The phenomenon of black holes.
- The stability of objects, the falling of rain, and all objects towards Earth.

Tides

- (1) Used in generating electricity as one of the renewable energy sources.
- (2) Used naturally to cleanse water bodies from impurities.

Spring balance (Newton meter)

Used for measuring the weight of objects.

Laws and problems on ?

1

Weight (w)
"Newton (N)"

=

Mass (m)
"Kilogram (kg)"

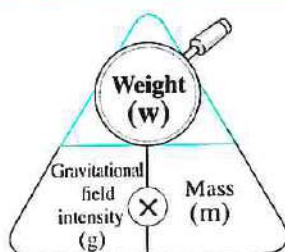
×

Gravitational field intensity (g)
Newton per kilogram (N/kg)

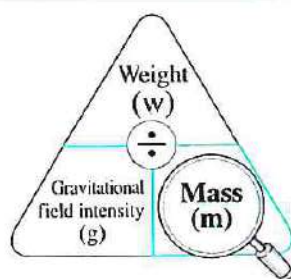
To calculate weight (w)

To calculate mass (m)

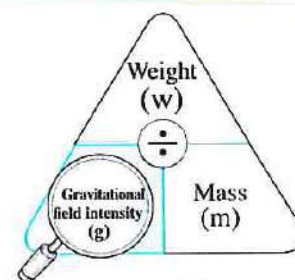
To calculate the gravitational field intensity (g)



$$w = m \times g$$



$$m = \frac{w}{g}$$



$$g = \frac{w}{m}$$

Example 1

Calculate the weight of an object with a mass of 50 g at Earth's surface.

[knowing that Earth's gravitational field intensity = 10 N/kg]

Solution

$$\text{Mass in kilogram} = \frac{50}{1000} = 0.05 \text{ kg}$$

$$\begin{aligned} \text{Weight (w)} &= \text{Mass of the object (m)} \times \text{Gravitational field intensity (g)} \\ &= 0.05 \times 10 = 0.5 \text{ N} \end{aligned}$$

Example 2

If you know that the gravitational field intensity at a certain location is 10 N/kg, calculate the mass of an object with a weight of 490 N on Earth's surface

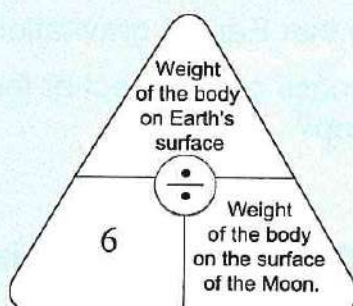
■ **Solution**

$$\text{Mass (m)} = \frac{\text{Weight (w)}}{\text{Earth's gravitational field intensity (g)}} = \frac{490}{10} = 49 \text{ kg}$$

2

Moon gravitational field intensity $\oplus \frac{1}{6}$ Earth's gravitational field intensity

Weight of an object on the Moon's surface $\oplus \frac{1}{6}$ Weight of the object on Earth's surface



Notes

- * The intensity of the gravitational field varies according to the distance from Earth's center.

Where as:

- It decreases by moving away from Earth's center (by moving upwards above Earth's surface).
- It increases by moving closer to Earth's center (by moving downwards to Earth's surface).
- * The mass of an object remains constant and does not change from one place to another.

Example 1

An object with a mass of 60 kg on the surface of the Moon, calculate its weight on: [Note that Earth's gravitational field intensity = 10 N/kg]

(1) Earth's surface.

(2) Moon's surface.

Solution

- (1) Weight of the object on Earth's surface (w) = object Mass (m) $\times$ Earth's gravitational field intensity = $60 \times 10 = 600 \text{ N}$
- (2) $\therefore$ The Moon's gravitational field intensity = $\frac{1}{6}$ Earth's gravitational field intensity
 $\therefore$ Weight of the object on the Moon's surface (w) = $\frac{1}{6}$ object's weight at Earth's surface
- $$= \frac{1}{6} \times 600 = 100 \text{ N}$$

Example 2

If the mass of an object at the top of a mountain is 30 kg

- (1) Determine the weight of the object at the base of the mountain.
[Note that Earth's gravitational field intensity is $=10 \text{ N/kg}$]
- (2) What is the difference in the mass of an object at the base of the mountain compared to its mass at the top?

Solution

- (1) Object weight at the base of the mountain (w) = Object mass at the base of the mountain (m) $\times$ Gravitational field intensity (g)
- $$= 30 \times 10 = 300 \text{ N}$$
- (2) $\therefore$ Object mass at the base of the mountain (m) = Object mass at the top of the mountain (m) = 30 kg
- $\therefore$ The difference in the mass of an object at the base of mountain and its mass at the top = zero

What are the results of



- ① **Increasing the distance between the centers of two material objects (according to the gravitational force between them).**

The gravitational force between them decreases.

- ② **The presence of gravitational force.**

The stability of objects and the falling of rain, and all objects towards Earth.

- ③ *** The presence of an object in the outer space (according to the mass and weight of the object).**

*** An object being launched outside Earth's gravitational field (according to the mass and weight of the object).**

The object's mass remains constant while its weight becomes zero.

④ * The difference in Earth's gravitational field intensity from one place to another on Earth's surface (according to the object's mass and weight).

* Gravitational field intensity varies from one place to another on Earth's surface (according to the mass and weight of the object).

The mass of the object remains constant, while its weight changes from one place to another on Earth's surface.

⑤ Moving of an object (astronaut) from Earth's surface to the Moon's surface (according to the mass and weight of the object (astronaut)).

The mass of the object (the astronaut) remains constant, while the weight becomes $\frac{1}{6}$ its weight on Earth's surface.

⑥ Ascending upwards above Earth's surface (according to the intensity of the gravitational field).

The intensity of the gravitational field decreases.

Give reason



① Gravitational, electric, and magnetic forces have fields, whereas friction forces do not have a field.

Because gravitational, electric, and magnetic forces are forces that act on objects at a distance without touching, while friction forces are considered contact forces.

② Collision forces are contact forces, whereas Earth's gravitational force is a field force.

Because collision forces act on objects when they touch each other and don't have field, whereas Earth's gravitational force act on objects within its field from a distance without touching.

③ The occurrence of tides phenomenon in the seas and oceans.

Due to the gravitational force between the Moon and Earth.

④ The state of the seas differs when the Moon is in the crescent phase compared to its state during the new moon and full moon phases.

Because tides are at their peak when the Moon is full moon or new moon.

⑤ The occurrence of the Moon's orbital motion around Earth.

Due to the gravitational force between them.

- 6 The mass of an object doesn't change from one place to another, while the weight of an object changes from one place to another.

Because the mass of an object is the amount of matter in this object, which is a constant amount and does not change, whereas the weight of an object changes due to change in the gravitational field intensity acting on it.

- 7 The weight of an object decreases as we move away from Earth's surface.

Because the Earth's gravitational field intensity decreases as we move away from Earth's surface.

- 8 The weight of the object becomes zero in the outer space.

Due to the absence of gravity in the outer space.

- 9 The weight of an object changes from one planet to another.

Because the gravitational field intensity changes from one planet to another.

- 10 An object's weight on Earth's surface is always greater than its mass.

Because the weight of an object is equal to the product of its mass and Earth's gravitational field intensity.

Compare between ?

1	Field Forces	Contact Forces
Definition	Forces that act on objects located in their field at a certain distance without touching	Forces that act on objects when they touch each other and they don't have a field
Examples	* Electrostatic forces (static electricity). * Magnetic forces. * Gravitational forces.	* Collision forces. * Friction forces. * Elastic forces.

2 Electric Forces	Magnetic Forces	Gravitational Forces
An electric charge affects another electric charge at a distance	A magnetic pole affects another magnetic pole at a distance	The mass of an object affects the mass of another object at a distance
Could be either attraction or repulsion forces	Could be forces of attraction or repulsion	Attraction forces only
Represented by electric field lines	Represented by magnetic field lines	Represented by gravitational field lines

3	Mass	Weight
Definition	The amount of matter in an object	The gravitational force that Earth exerts on an object
Measuring unit	Kilogram (kg)	Newton (N)
Mathematical law	$m = \frac{w}{g}$	$w = m \times g$
The change in magnitude with changing in the position of the object	Its magnitude does not change when the object is moved from one place to another (it remains constant)	Its magnitude changes with changing the position of the object from one place to another

Study the following figures, then answer ?

The following two figures show the mutual gravitational forces between two pairs of objects that are made up of the same material:

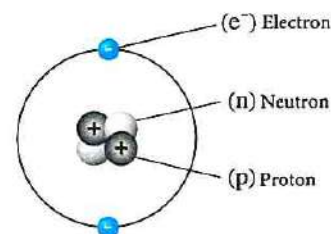


What is the reason for the difference in the mutual gravitational forces between the objects in Figure (1) and in Figure (2)?

Solution

The masses of the two objects in Figure (1) are greater than the masses of the objects in Figure (2), and the gravitational forces increase by increasing the masses of the objects

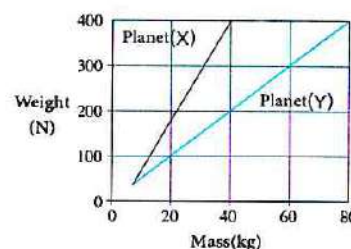
Based on what you have studied, explain the types of field forces in the helium atom (${}^4_2\text{He}$), with determining the weakest force of them.



- (1) **Electrostatic attraction force** between the positively charged nucleus and each of the two negatively charged electrons.
- (2) **Electrostatic repulsion force** between the two negatively charged electrons.
- (3) **Electrostatic repulsion force** between the two positively charged protons.
- (4) **Gravitational force** between the nucleus and each of the electrons, which is the weakest force.

The opposite graph shows the relation between weight and mass for several different objects on the surfaces of two different planets.

Which planet has the lower gravitational field intensity? With explanation.



The solution

The planet (Y) / because the mass of an object is constant and does not change from one planet to another, the weight of that object decreases by decreasing the the gravitational field intensity (the weight of an object with a mass of 40 kg on the surface of planet (Y) is less than its weight on the surface of planet (X)).

Variant questions ?

Q1 List the most important discoveries of the scientist Isaac Newton.

A He discovered that all material objects in the universe attract each other.

Q2 What are the factors affecting the mutual gravitational force between two material objects

A * The distance between the centers of the two objects.

* The masses of the two objects.

Q3 When does the gravitational force between two objects increase?

A When the masses of the two objects increase or when the distance between their centers decreases.

Q4 Mention the properties of tides, and mention one of the places where they are clearly observable.

A * **Properties**

(1) They occur periodically and regularly twice a day (once every 12 hours).

(2) They are at their peak when the Moon is either new moon or full moon.

* It is clearly observed in the Bay of Fundy in Canada.

Q5 Mention examples of orbital motion.

A - The motion of the Moon around Earth.

- The motion of Earth around the Sun.

- The motion of satellites around Earth.

Test 1

On the ionic bonding

15 Marks

1 [A] Correct the underlined words :

4 Marks

- (1) The symbol X^{3-} indicates that the outermost energy level of the atom of this ion contains 1 electron. (.....)
- (2) The number of energy levels for a negative ion is greater than the number of energy levels for its atom. (Zarka / Damietta 25) (.....)
- (3) The ionic compound molecule is positively electric charged. (.....)
- (4) The ionic bonding in the potassium fluoride molecule is represented by Lewis dot structure as follows $[\text{K}]^+ [\text{F}]^-$ (.....)

[B] Give reason for: When a halogen gains an electron, it turns into a negative ion.

(Assiut / Assiut 25)

1 Mark

2 [A] Choose the correct answer :

4 Marks

- (1) When an oxygen atom $^{16}_8\text{O}$ is converted into an ion, the number of nucleons (Luxor / Luxor 25)
- (a) decreases by 2 (b) increases by 2
- (c) remains 16 (d) remains 8
- (2) Electron configuration of potassium ion $^{39}_{19}\text{K}$ is similar to the electron configuration of ion (Deirb Najm / Sharkia 25)
- (a) $^{16}_8\text{O}$ (b) $^{23}_{11}\text{Na}$ (c) $^{40}_{18}\text{Ar}$ (d) $^{35}_{17}\text{Cl}$
- (3) All of the following elements are stable, their atoms are not bonding with each other or with other elements under normal conditions, except
- (a) hydrogen. (b) helium. (c) neon. (d) argon.
- (4) Which of the following pairs have the same number of electron ?
- (a) $^{23}_{11}\text{Na}^+$, $^{35}_{17}\text{Cl}^-$ (b) $^7_3\text{Li}^+$, $^{35}_{17}\text{Cl}^-$ (c) $^{24}_{12}\text{Mg}^{2+}$, $^{32}_{16}\text{S}^{2-}$ (d) $^{23}_{11}\text{Na}^+$, $^{19}_9\text{F}^-$

[B] Compare between: Metals and nonmetals (according to the type of ion they form).

1 Mark

(Atfih / Giza 25)

3 [A] Put (✓) in front of the correct statements and [X] in front of the wrong ones, and correct them: :

4 Marks

- (1) The aqueous solutions of ionic compounds do not conduct electricity. (Esna / Luxor 25) ()

(2) The compound NaBr is composed of the combination of two nonmetals in a fixed mass ratio. (Baltim / Kafr El-Sheikh 25) ()

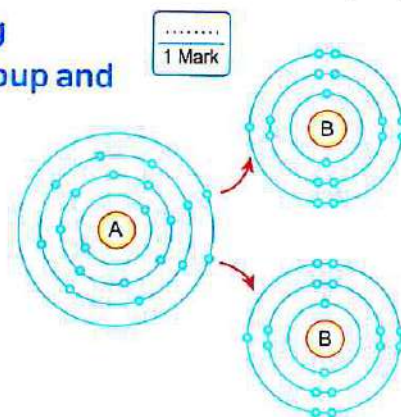
(3) Ionic bond results in compound molecules only. (Kom Hamada / Beheira 25) ()

(4) In a positive ion, the number of positive protons is equal to the number of negative electrons that revolve around the nucleus. ()

[A] The opposite figure shows the process of ionic bonding between metal atom (A) from alkaline earth metals group and two nonmetals atoms (B) from the halogen group:

(1) Determine the number of charges carried by each of the formed cation and anion.

(2) What is the molecular formula of the resulting ionic compound from their bonding ?



Test 2 On covalent bonding

15 Marks

1 [A] (1) Write the scientific term (or name) of each of the following statements :

2 Marks

1. A bond forms between two atoms of the same nonmetallic element or between two atoms of different nonmetallic elements. (Agouza / Giza 25) ()

2. Compounds most of them are insoluble in water and do not usually conduct electricity. (Desouk / Kafr El-Sheikh 25) ()

(2) Correct the underlined words :

2 Marks

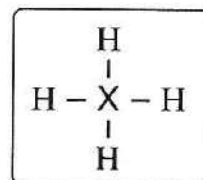
1. The bond between elements of group 6A and elements of group 7A is ionic. (Nuzha / Cairo 25) ()

2. Water molecule is considered the simplest molecule of an organic compound. (Centre / Alexandria 25) ()

[B] From the opposite figure:

(Centre / Alexandria 25)

What is the type of bonding in this compound? give a reason.



1 Mark

2 [A] Choose the correct answer :

4 Marks

(1) The bond in which each atom shares a single valence electron is called bond.

(Nabrouh / Dakahlia 25)

(a) ionic

(b) single covalent

(c) double covalent.

(d) triple covalent

(2) The bond in molecule is a triple covalent bond.

(Nabrouh / Dakahlia 25)

(a) hydrogen

(b) nitrogen

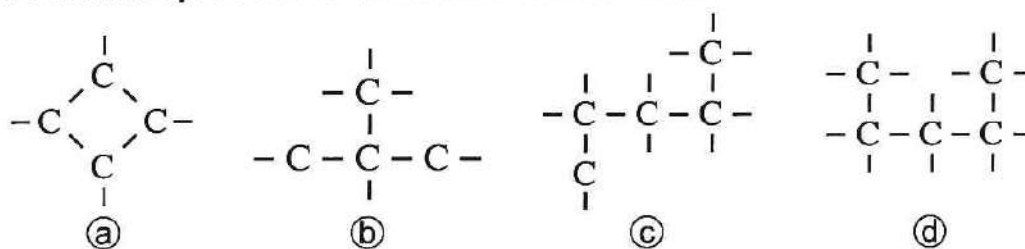
(c) oxygen

(d) water

(3) In hydrogen molecule, each atom shares eletron(s). (Nabrouh / Dakahlia 25)

- (a) one (b) two (c) three (d) four

(4) Figure represents a branched carbon chain.



[B] Give reason for : Covalent bonding results in compound molecules or elements molecules.

1 Mark

(Abu Homos / Beheira 25)

3 [A] (1) Put (✓) in front of the correct statements and [X] in front of the wrong ones, and correct them :

2 Marks

- Melting point of covalent compounds is high. (Ismailia / Ismailia 25) ()
- Hydrogen atoms are characterized from the other elements by their ability to bond with each other in organic compounds in the form of cyclic structure. ()

(2) Choose the odd statement [or symbol], then write what connects the rest of the statements [or symbols].

2 Marks

- Water molecule / Oxygen molecule / Ammonia molecule / Methane molecule. (Manzila / Dakahlia 25) ()
- H_2 / O_2 / H_2O / KCl

[B] Explain using Lewis structure how the following atoms bond :

1 Mark

1_1H atom with $^{35}_{17}Cl$ atom

(Baraka al-Saba / Menoufia 25)

Test 3

On whole lesson

15 Marks

1 [A] Complete the following statements :

2 Marks

- The bond in sodium chloride molecule is , while the bond in hydrogen chloride molecule is
- In the modern periodic table, the closest noble gas to calcium $^{20}_{20}Ca$ in atomic number is , and for the fluorine 9F is

[B] Give reasons for:

3 Marks

- Ionic bonding results in compound molecules only.
- The bonds in water molecule are single covalent bonds.

(3) Oxygen ion carries two negative charges.

(Matrouh / Matrouh 25)

2 [A] Choose the correct answer :

2 Marks

(1) What is the symbol of an ion whose nucleus contains 11 protons and is surrounded by 10 electrons?

(Qaha / Qalyoubia 25)

- (a) Cl^- (b) O^{2-} (c) Mg^{2+} (d) Na^+

(2) Which of the following elements are not bonded with chlorine under normal conditions?

(Ashmoun / Menoufia 25)

- (a) Hydrogen (b) Helium (c) Magnesium (d) Sodium

[B] Draw a diagram showing the electron configuration of the atom of $^{27}_{13}\text{Al}$, element then answer:

3 Marks

(1) Calculate the number of neutrons.

(2) Determine the type of the ion.

(3) Draw Lewis dot structure for the element.

(Ashmoun / Menoufia 25)

3 [A] Write the name that describes each of the following statements:

2 Marks

(1) Compounds most of them dissolve in water and have high melting and boiling points.

(Kom Hamada / Beheira 25) (.....)

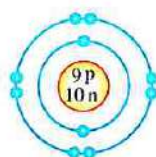
(2) A metal atom that has lost one or more electrons.

(Kom Hamada / Beheira 25) (.....)

[B] Study the two following figures, then answer the questions below each one :

2 Marks

(1)

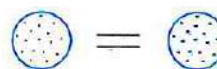


1. What is the type of this ion ?

2. How many electrons are in its atom ?

(2)

(Semesta / Beni Suef 25)



1. What is the type of chemical bonding in this molecule ?

2. How many electrons are shared in forming this bond ?

(3) Explain with Draw a diagram Lewis dot structure of the following :

1 Mark

Covalent bonding in nitrogen molecule.

(Baraka Al-Sub'a / Menoufia 25)

Test 1

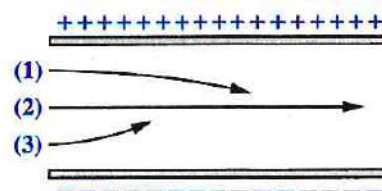
On the beginning of the lesson till the electric field

15 Marks

1 [A] Complete the following statements:

4 Marks

- (1) is from the conducting materials, while is from the non-conducting materials. (Husseinia / Sharkia 25)
- (2) The object that loses electrons is charged with a charge, while the object that gains electrons is charged with a charge (Omraniya / Giza 25)
- (3) The electric charges attract each other, while the electric charges repel each other. (West / Alexandria 25)
- (4) The opposite figure shows the path of three subatomic particles through an electric field composed of two plates, number represents electron, while number represents neutron.



[B] Mention the most important contributions of scientist Charles-Augustin de Coulomb.

1 Mark

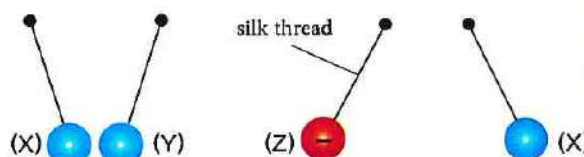
2 [A] Put [✓] in front of the correct statement and [x] in front of the wrong ones, and correct them:

4 Marks

- (1) Paper scraps are attracted to the iron rod held by hand. ()
(East Nasr City / Cairo 25)
- (2) When you rub a glass rod with a piece of silk, the glass rod gains a positive charge, while the silk piece gains a negative charge. (Abo Al-Nomros / Giza 25) ()
- (3) A piece of wool is more capable of losing electrons than a piece of silk. ()
(Al-Sharabia / Cairo 25)
- (4) When two ebonite rods rubbed with a piece of wool separately, they attract each other. ()

[B] The opposite figures show three charged balls (X), (Y), (Z).

Determine the type of charge of each of the balls (X), (Y), with an explanation.



1 Mark

3 [A] Write the scientific term of each of the following:

4 Marks

- (1) A method of painting metals with a uniform layer without wasting painting material. (Abo Al-Nomros / Giza 25) (.....)
- (2) The arrangement of the elements according to their ease of losing electrons when they are rubbed with each other. (Minia Al-Qamh / Sharkia 25) (.....)
- (3) The device used for the measure of weak electrical charges. (Matarya / Cairo 25) (.....)
- (4) Charges accumulated on the surfaces of objects as a result of being rubbed with another object made of suitable materials. (Hamam / Matrouh 25) (.....)

[B] What happens when you bring a glass rod closer to an ebonite rod after rubbing them with a piece of cotton cloth? **Explain your answer.**

1 Mark

(Mahmodia / Beheira 25)

Test 2 On the electric field till the end of the lesson

15 Marks

1 [A] Correct the underlined:

4 Marks

- (1) The area surrounding an electric charge in which its effect appears is known as electric force lines. (.....)
- (2) The divergence of the leaves of a positively charged electroscope decreases when a wooden rod rubbed with wool is brought close to the electroscope's disk. (.....)
- (3) The two leaves of the electroscope are made of silver. (South / Giza 25) (.....)
- (4) The electroscope works to discharge electrical charges accumulated on clouds. (Borg Al-Arab / Alexandria 25) (.....)

[B] The opposite figure shows three cases of electroscope leaves

Determine what happened in steps (1) and (2).

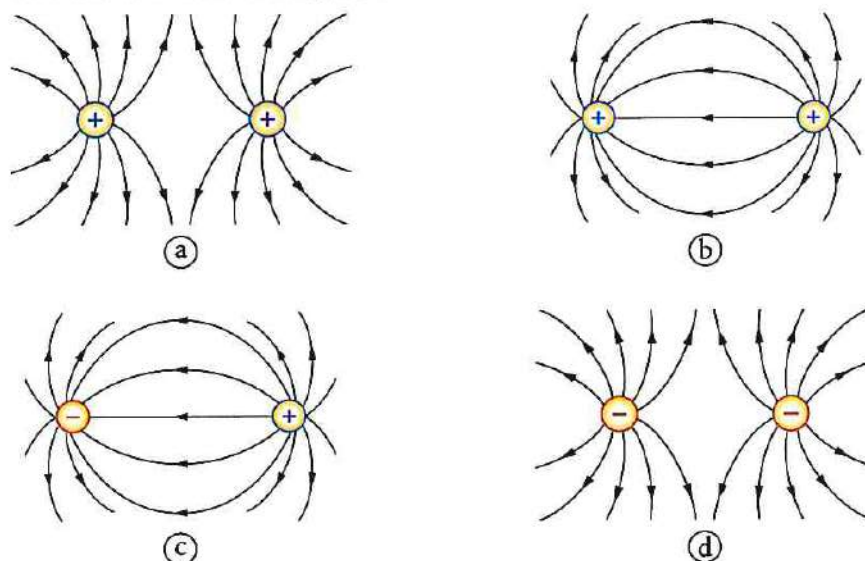


2 [A] Choose the correct answer:

4 Marks

- (1) Electric field lines are almost parallel between (Beba/Beni-suef 25)
 - (a) a negative metal plate and a negative charge.
 - (b) a positive metal plate and a positive charge
 - (c) a positive charge and a negative charge.
 - (d) positive metal plate and a negative metal plate.
- (2) Fuel tanks are connected to chains touching the ground made of (Minia Al-Qamh / Sharkia 25)
 - (a) wood.
 - (b) plastic.
 - (c) iron.
 - (d) synthetic leather.

(3) Which of the following figures correctly represents the electric force lines between two electric charges?



(4) The device is used to detect the electric state of an unknown object.

(Rashid / Beheira 25)

- (a) electroscope (b) spring balance (c) Newton meter (d) coulomb meter

[B] What happens when a positively charged object is brought close to a disk of a positively charged electroscope.

(Port Said / Port Said 25)

1 Mark

3 [A] (1) Complete the following statements:

3 Marks

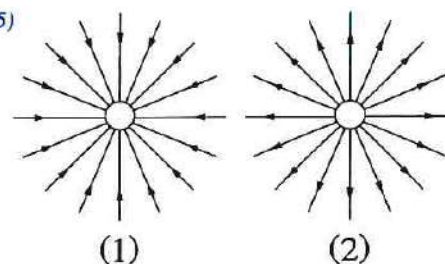
1. Electrostatic charges are formed on objects in several ways, including

(Manyah Al-Nasar / Dakahlia 25)

2. In the two opposite figures:

(Nozha / Cairo 25)

Figure (1) represents the electric force lines for the charge, while Figure (2) represents the electric force lines for the charge



3-Among the properties of electric field lines,

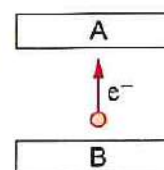
that they are lines that do not intersect and end at surfaces without penetrating them.

(2) Give an example of a practical application for discharging accumulated electric charges on an object.

1 Mark

[B] When an electron e^- is present between two plates (A) and (B) charged with two opposite electric charges as shown in the figure, it moves towards plate (A). (Kaft / Qena 25)

1 Mark



What is the direction of the electric field lines between the two plates? Explain your answer.

Test 3

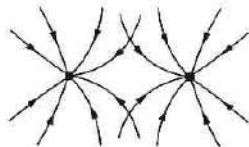
On whole lesson

15 Marks

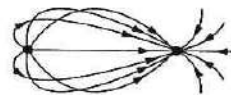
1 [A] Choose the correct answer:

2 Marks

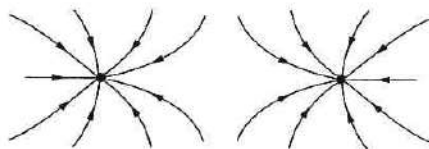
- (1) Which of the following materials gains a negative charge when rubbed with wool?
 (a) glass. (b) cotton. (c) silk. (d) wood. *(Qom ombo / Aswan 25)*
- (2) Which of the following is considered a possible electric field between two electric charges?



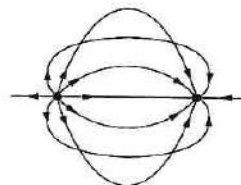
(a)



(b)



(c)



(d)

[B] Give reasons for:

3 Marks

1. A metal ruler cannot be charged by rubbing. *(Kotoor / Gharbia 25)*
2. Fixing the lightning rods near high structures and buildings. *(East / Kafr El-shikh 25)*
3. The two wooden rods repel after each of them has been rubbed with a piece of cotton. *(West / Fayoum 25)*

2 [A] Extract the odd word [or statement], then mention what relates the rest words [or statements]:

2 Marks

- (1) Copper / Iron / Carbon / Ebonite / Aluminium. *(Tamiya / Fayoum 25) (.....)*
- (2) Imaginary lines / Do not intersect with each other / Do not penetrate the surfaces of metal objects / Start from the negative charge.

(Damietta Elgdida / Damietta 25) (.....)

[B] What happens when:

- (1) Taking off woolen clothes in winter. *(Edko / Beheira 25) 3 Marks*
- (2) Bringing a glass rod rubbed with silk near the disk of an electroscope charged with a negative electric charge. *(West El-Mansora / Dakahlia 25)*

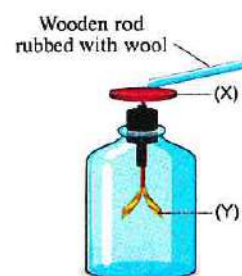
- (3) A beam of protons passes between two parallel plates, each carrying an opposite electric charge.

3 [A] Put [✓] in front of the correct statement and [x] in front of the wrong ones:

1. Fuel tanks are connected with metal chains that touch the ground to discharge static electricity. (East / Kafr El-Sheikh 25) ()
2. The materials in the electrostatic series are arranged according to their ability to conduct electricity. (Qalyoub / Qalyoubia 25) ()

[B] The opposite figure shows a wooden rod rubbed with a piece of wool touching part (X):

3 Marks



- (1) What is the name of the device shown in the figure?
.....
- (2) Select the type of the charge formed on part (Y), with an explanation.
.....
- (3) Determine the materials from which the two parts (X) and (Y) are made.
.....

UNIT 2

Lesson Two

Magnetic forces

Test 1

On magnets and magnetic properties

15 Marks

1 [A] Put [✓] in front of the correct statement and [x] in front of the wrong ones, and correct them:

4 Marks

- (1) The south pole of a magnet is symbolized by the letter S and is often colored red. (Nubaria / Beheira 25) ()
- (2) Forensic experts use a magnetic brush and a copper filings to reveal unclear fingerprints. ()
- (3) Magnetic forces increase as we get closer to the middle of the magnet. ()
(Nekhila / Matruh 25)
- (4) The magnetic north pole of Earth represents the geographical north pole of Earth. (East Zagazig / Sharkia 25) ()

[B] What happens when dividing one magnet into two pieces?

1 Mark

2 [A] (1) Extract the odd word, then write what connects the rest of the words:

2 Marks

1. Iron / Nickel / Cobalt / Aluminium.

(Rawda / Damietta 25)

2. Horse shoe magnet / Bar magnet / Lodestone / Ring magnet.

(Foh / Kafr El-Sheikh 25)

(2) Write the scientific term of each of the following:

2 Marks

1. Materials that are not attracted to magnets.

(Sennars / Fayoum 25) (.....)

2. The geographical pole of Earth, which is represented by the south pole of a freely suspended magnet.

(Foh / Kafr El-Sheikh 25) (.....)

[B] From the opposite figure:

Determine the name of the tool shown in the figure, and mention the type of material used in manufacturing part (X).



1 Mark

3 [A] (1) Choose the correct answer:

2 Marks

1. All of the following are non-magnetic materials, except

(Kaha / Qalyoubia 25)

(a) Cu

(b) Ag

(c) Au

(d) Fe

2. The geographical direction that a freely suspended magnet always takes as its direction is.....

(Sidi Salem / Kafr El-Sheikh 25)

(a) east - west. (b) north - south.

(c) south - west.

(d) north - east.

(2) Correct the underlined word[s]:

2 Marks

1. Lightning rod is an old tool used to determine the four geographical directions.

(Abo-Qrqas / Minia 25) (.....)

2. The least force of attraction of a magnet is at the poles.

(Nabrouh / Dakahlia 25) (.....)

[B] Give a reason for:

1 Mark

The freely suspended magnet always takes a fixed direction.

(Matrouh / Matrouh 25)

Test 2

On the law of attraction and repulsion and the magnetic field

15 Marks

1 [A] Choose the correct answer:

4 Marks

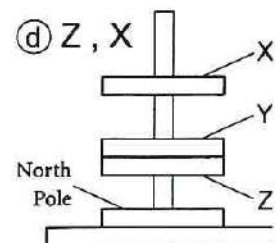
(1) The opposite figure: represents two magnets. Which of the following represents two identical poles?

- (a) Y , W (b) X , W (c) Y , X

W	X
Y	Z

(2) The opposite figure shows four ring magnets placed around a vertical rod. Which of the following represents the poles (X), (Y), and (Z)?

- (a) (X): South, (Y): North, (Z): South.
 (b) (X): South, (Y): South, (Z): North.
 (c) (X): North, (Y): North, (Z): South.
 (d) (X): North, (Y): South, (Z): North.



(3) One of the properties of magnetic field lines is that they are

(West Mansoura / Dakahlia 25)

- (a) intersecting with each other. (b) starting at the south pole.
 (c) real lines. (d) crowded at the poles.

(4) Which of the following substances forms only attractive force with a magnet?

- (a) Compass needle. (b) A piece of copper.
 (c) A horse shoe magnet. (d) Iron nail.

[B] Mention two differences between:

1 Mark

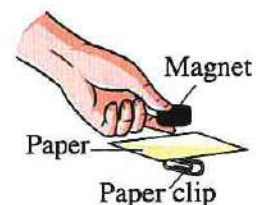
Electric field lines and magnetic field lines.

2 [A] Correct the underlined word[s]:

4 Marks

(1) Only repulsion forces arise between magnets. (.....)

(2) In the opposite figure, the paper clip is attracted to the magnet even though there is a piece of paper between them, because the different poles attract each other. (.....)

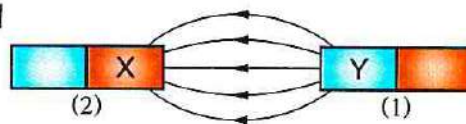


(3) The region around a magnet where the effect of its magnetic force appears is called the gravity.

(Saqalta / Sohag 25) (.....)

(4) When the N pole of a magnet is brought close to the A pole of another magnet, they repel each other. (East / Kafr El-Sheikh 25) (.....)

- [B]** The opposite figure shows the magnetic field lines between two magnets (1) and (2).
determine the type of each pole (Y) and (X) of the magnets.



1 Mark

- 3 [A] (1) Complete the following statements:**

2 Marks

- Magnetic field lines end at which is symbolized by letter
- The force arising between a magnet and materials in its field is only a force.

- (2) Put [✓] in front of the correct statement and [x] in front of the wrong ones:**

2 Marks

- Magnetic field lines are straight lines (El-Ngila / Matrouh 25) ()
- When a piece of nickel is brought close to a magnetic pole, a repulsive force occurs between them. (Qalyoub / Qalyoubia 25) ()

- [B] Mention** the law of attraction and repulsion.

(Qalyoub / Qalyoubia 25)

1 Mark

Test 3

On whole lesson

15 Marks

- 1 [A] Write the scientific term of each of the following statement :**

2 Marks

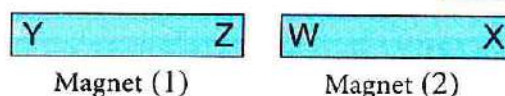
- Imaginary lines that do not intersect, start at the north pole of the magnet and end at the south pole. (Qalyoub / Qalyoubia 25) (.....)
- A tool used by forensic experts with iron filings to detect unclear fingerprints. (Zohor / Port Said 25) (.....)

- [B] In the two opposite figures:**

(El-Tal ElKbir / Ismailia 25)

3 Marks

When approaching pole (Y) of magnet (1) to pole (X) of magnet (2), a repulsive force occurs between them.



What happens when you bring the following poles close to each other :

- Pole Z to pole X
- Pole Z to pole W
- Pole Y to pole W

- 2 [A] Complete the following statements:**

2 Marks

- Similar magnetic poles , while different magnetic poles

(West / Alexandria 25)

- When a magnet is brought close to a mixture of copper filings and iron filings, the will be attracted to the magnet, while will not be attracted to it.

[B] Give reason for the following statements:

3 Marks

(1) The compass needle is placed inside a copper box.

(Youssef Al-Siddiq / Fayoum 25)

(2) Nickel and cobalt are considered magnetic materials.

(Sherbin/Dakahlia 25)

(3) Iron filings are attracted in large amounts at the poles of a magnet.

(Matariah / Cairo 25)

3 [A] Choose the correct answer :

2 Marks

(1) Earth acts as a magnet that affects the magnetic needle of a compass and directs it so that the south pole of the compass needle points to

(Beba / Beni Suef 25)

(a) the geographical north pole of Earth. (b) magnetic south pole of Earth.

(c) center of Earth.

(d) magnetic north pole of Earth.

(2) Which of the following is considered a magnetic material?

(Agouza / Giza 25)

(a) Wooden stick.

(b) A silver ring.

(c) An iron nail.

(d) A copper pot.

[B] (1) What is meant by magnetic field?

(Dar Al-Salam/Sohag 25)

1 Mark

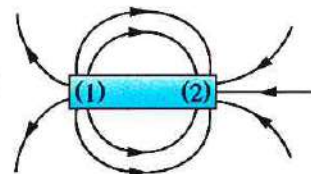
(2) **Mention** the importance of a compass.

(Delnajat / Beheira 25)

1 Mark

(3) **From the opposite figure:**

Determine the type of each of the poles (1) and (2) in this magnet, **writing** the symbol for each one.



1 Mark

UNIT 2

Lesson Three

Gravitational Forces

Test 1

On the classification of forces

15 Marks

1 [A] Complete the following statements :

4 Marks

(1) The phenomenon of occurs in Fundy Bay Canada, due to the force of

(Tamiya/Fayoum 25)

(2) Examples of contact forces include and

(Ihnacia / Beni Suef 25)

(3) Objects fall towards Earth's surface by a force called and this force increases by increasing in the of the object. (Agouza / Giza 25)

(4) The type of forces in the ${}^2\text{He}$ atom are force between the two negative electrons and force between the nucleus and each of the two electrons.

[B] Give a reason for :

Satellites do not fall out of their orbit around Earth.

.....
1 Mark

*

(Zarqa / Damietta 25)

2 [A] Write the scientific term of each of the following statements:

.....
4 Marks

(1) Areas in space formed as a result of the collapsing of a massive star at the end of its life. (Manzala / Dakahlia 25) (.....)

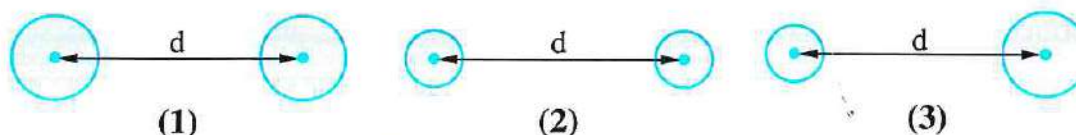
(2) The phenomenon of daily elevation and recession of water in seas and bays. (Minya Al-Qamh / Sharkia 25) (.....)

(3) The movement of the Moon around another central object such as Earth in a curved path. (Minya Al-Nasr / Dakahlia 25) (.....)

(4) Forces act on objects at a distance without touching. (Kafir Al-Dawar / Beheira 25) (.....)

[B] The following figures represent several spherical objects made of the same material, where each object is separated from the other by a distance (d):

.....
1 Mark



Arrange the mutual gravitational forces between each pair of the spherical objects in an ascending order. Explain your answer.

*

3 [A] Correct the underlined word[s] :

.....
4 Marks

(1) The Scientist Coulomb discovered that material objects in the universe attract each other. (Burj Al-Arab / Alexandria 25) (.....)

(2) The revolving of electrons around the nucleus of helium atom is an example of spiral motion. (.....)

(3) The phenomenon of eclipses is used as a source of renewable energy. (.....)

(4) The space in which Earth's gravitational force affects material objects is called the magnetic field. (.....)

[B] Mention one difference between: friction forces and magnetic forces.

.....
1 Mark

(Damanhur / Beheira 25)

Test 2

On the relation between weight and gravity

15 Marks

1 [A] Choose the correct answer :

4 Marks

(1) What is the ratio of the mass of an object on the surface of the Moon to its mass on the surface of Earth?

(Zarqa / Damietta 25)

- (a) 1 : 6 (b) 6 : 1 (c) 1 : 1 (d) 6 : 5

(2) All of the following change when the position of an object changes from a place to another, except

(West Mansoura / Dakahlia 25)

- (a) weight. (b) mass.
(c) Earth's gravitational force. (d) the strength of the field affecting it.

(3) An object with a mass of 26 kg weighs 200 N on the surface of a planet, so the gravitational field intensity on the surface of this planet is equal to

- (a) 5200 N/kg (b) 250 N/kg (c) 7.7 N/kg (d) 0.13 N/kg

(4) The gravitational force that Earth exerts on an object is estimated in

(Qaft / Qena 25).

- (a) Coulomb. (b) Newton.
(c) kilogram. (d) Newton/kilogram.

[B] Give a reason for : The weight of an object is greater than its mass.

1 Mark

(Aga / Dakahlia 25)

*

2 [A] Correct the underlined words:

4 Marks

(1) The weight of the object is zero on the surface of the Moon.

(Arment / Luxor 25) (.....)

(2) The mass of an object weighing 245 N at Earth's surface is equal to 4250 kg.
Given that Earth's gravitational field intensity is 10 N/kg

(Mahmoudiya / Beheira 25) (.....)

(3) The weight of an object on the surface of the Moon is $\frac{1}{2}$ its weight
on the surface of Earth. (.....)

(4) The amount of matter contained in an object is known as volume. (.....)

[B] What happens when : Approach to the center of Earth
(according to the object weight)

1 Mark

(Abo Homos / Beheira 25)

*

3 [A] Complete the following statements:

4 Marks

(1) Gravitational field intensity by moving away from Earth's surface.

(Baraka Al-Saba / Monoufia 25)

(2) The device is used to measure the object's weight.

(Salam / Cairo 25)

- (3) Gravitational field intensity on the surface of Earth equals times the gravitational field intensity on the surface of the Moon.
- (4) The ratio between the weight of an object at the base of a mountain and its weight at the top of the mountain is , than one .

[B] An object mass is 100 kg. Calculate its weight on the surface of the Moon.
(Knowing that Earth's gravitational field intensity = 10 N/kg)

1 Mark

*

.....

Test 3

On whole lesson

15 Marks

1 [A] Extract the odd word or statement, then mention the relation between the rest :

2 Marks

(1) Tides / The electrical state of an object / Falling of rain towards the Earth /
Orbital motion.

(Aga / Dakahlia 25)

*

(2) Elastic forces / Friction forces / Gravitational forces / Collision forces.

(Kafr Al-Dawar / Beheira 25)

[B] Compare between each of the following :

3 Marks

1. Mass and weight (In terms of: the measuring unit).

(Akhmim / Sohag 25)

*

2. Magnetic field and Earth's gravitational field (In terms of: the definition).

(10th of Ramadan / Sharkia 25)

*

3. The phenomenon of tides and the phenomenon of black holes:

(In terms of : the cause of each of them)

(Simbalaween / Dakahlia 25)

*

2 [A] Complete the following statements:

2 Marks

1. Black holes in space are characterized by enormous , so that even
cannot escape from them.

(Hamoul / Kafr Al-Sheikh 25)

2. An object with a mass of 6 kg weighs..... on the surface of Earth and its
weight on the surface of the Moon is

(Knowing that Earth's gravitational field intensity = 10 N/kg)

(West / Alexandria 25)

[B] (1) **Mention the importance of :** Newton meter (spring balance). *(Qantara West / Ismailia 25)*

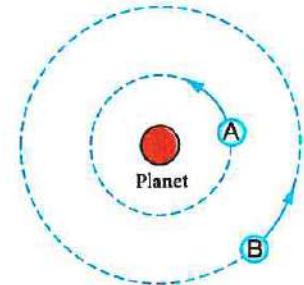
1 Mark

(2) **The opposite figure shows the movement of two satellites around a planet:**

2 Marks

1. Which force keeps the orbital motion of satellites around this planet?

2. **Which is greater:** the mutual force between the planet and the satellite (A) or the mutual force between the planet and the satellite (B)? **Why?**



3 [A] **Choose the correct answer :**

2 Marks

(1) The phenomenon of is used to generate electrical energy and purifying water bodies from impurities.

(Sherbin / Dakahlia 25)

- (a) tides (b) black holes
(c) orbital motion (d) photosynthesis

(2) When the gravitational field intensity acting on an object increases, its mass

(Wasata / Beni Suef 25)

- (a) increases. (b) decreases.
(c) doesn't change. (d) vanishes.

[B] (1) **If the mass of an object at the top of a mountain is 30 kg :**

(Deir Mawas / Minia 25)

1. Determine the weight of the object at the base of the mountain.
(Knowing that Earth's gravitational field intensity = 10 N/kg)

2 Marks

2. What is the difference between the mass of an object at the base of a mountain and at its top?

(2) **Give a reason for :** The weight of the an object is zero in the outer space.

(Sadat / Menoufia 25)

Exam model ? ON UNIT 2

24 Marks

Question 1 6 Marks

[A] Write the scientific term of each of the following statements :

2 Marks

- (1) The space in which Earth's gravitational force affects material objects with an attraction force towards the center of Earth. (West Mansoura / Dakahlia 25) (.....)
- (2) A natural phenomenon that occurs twice daily and is used naturally in cleansing water bodies from impurities. (Edfo / Aswan 25) (.....)

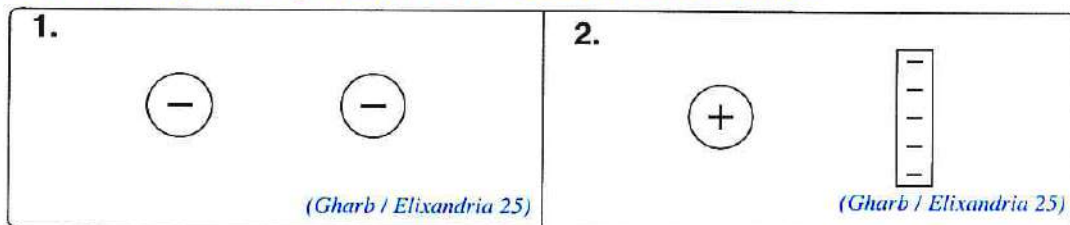
[B] (1) Mention the importance of each of the following :

2 Marks

1. The compass
2. Earth's gravitational force

(2) In the following two figures, draw the electric field lines:

2 Marks



Question 2 6 Marks

[A] Complete the following statements :

2 Marks

- (1) When silk is rubbed with cotton, silk gains charge while cotton gains a charge (Nagea Hamadi / Qena 25)
- (2) The device is used to determine the type of charge formed on objects, while the device is used to measure the weight of an object. (Kom Hamada / Beheira 25)

[B] Compare between each of the following:

4 Marks

- (1) Electric field and magnetic field (In terms of: the definition) (Luxor / Luxor 25)
.....
- (2) Elastic forces and electrostatic forces (In terms of: the type of forces). (Baltim / Kafr El-Sheikh 25)
.....
- (3) Magnetic materials and non-magnetic materials: (In terms of: the definition - give an example). (Quesna / Menoufia 25)
.....
- (4) Charging by rubbing and charging by contact. (In terms of: the definition) (Rahmaniya / Beheira 25)
.....

Question 3 6 Marks

[A] Correct the underlined word[s]:

2 Marks

(1) The magnetic attraction force is the greatest at its middle.

(Alrawda / Damietta 25) (.....)

(2) The compass box is made of iron so that it does not affect the movement of the magnetic needle.

(Santa / Gharbia 25) (.....)

[B] What happens when :

4 Marks

(1) A glass rod rubbed with silk touches the disk of the electroscope shown in the opposite figure.

(West Mansoura / Dakahlia 25)



(2) Dipping a magnetic rod into a mixture of iron filings and silver filings.

(North / Giza 25)

(3) An electron passes between two parallel charged plates, one with a positive charge and the other with a negative charge.

(4) Moving upward above the Earth's surface (according to the intensity of Earth's gravitational field).

(Minya Al-Qamh / Sharkia 25)

Question 4 6 Marks

[A] (1) Choose the correct answer :

2 Marks

(1) If the mass of an object on the surface of Earth is 60 kg, so its mass on the surface of the Moon will be kg

(Dalengat / Beheira 25)

(a) 6

(b) 10

(c) 60

(d) 0.6

(2) Black holes in space are usually formed when

(Ain Shams / Cairo 25)

(a) a massive star collapses at the end of its life.

(b) a planet expands at the beginning of its life.

(c) a massive star freezes at the end of its life.

(d) a planet collapses at the end of its life.

[B] (1) Mention the properties of the magnetic field lines

(Fouah / Kafr El-Sheikh 25)

1 Mark

(2) Give reasons for the following:

3 Marks

1. Electrostatic coating for metal surfaces is preferred than other methods.

(Malawi / Minya 25)

2. A metallic ruler cannot be charged by rubbing.

(Qatour / Gharbia 25)

3. You have two objects, the first object has a mass of 40 kg and the second object has a mass of 80 kg, Calculate the weight of each one.

(Note that Earth's gravitational field intensity = 10 N/kg)

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



حمل الآن

مجاناً وحصرياً

المراجعة رقم (2)

اختبار شهر نوفمبر



①

November Revision

"Unit 1 Lesson 4"

هتذاكر الدرس على شكل جداول عشان
يكون أسهل بس الذول تعالى نتفق ان:-

1- Nobel gases are stable elements
(G.R).

↳ Because the outermost level
is filled completely with
electrons.

2- Metals tend to lose their valence
electrons. (G.R).

↳ To reach to stable electron
configuration of nearest nobel
gas.

3- Non metals Tend to gain electrons
(G.R)

↳ to reach to stable electron
configuration of nearest nobel
gas.

4- When metals lose electrons, they
change into cation or positive ion.

(G.R) When sodium loses an electron
it becomes positive ion.

↳ Because the number of positive
protons is greater than number
of electrons

5- When non-metals gain electrons,
they change into Anion or negative ion.

(G.R) When chlorine gains an electron
it becomes negative ion.

↳ Because the number of negative
electrons is greater than number
of positive protons.

(2)

وده أول جدول وده مكان سؤال في التقييات :-

	Cation or Positive ion	Anion or negative ion.
Definition حفظ	it is metal that has <u>lost</u> 1 or more electrons.	it is non-metal that has <u>gain</u> 1 or more electrons.
Electrons	<u>less than</u> protons.	<u>more than</u> protons.
protons	doesn't change.	doesn't change.
Energy levels	<u>less than</u> the number of energy level in it's atom.	<u>equal to</u> the number of energy level in it's atom.
Charges	Carry positive charges equal to number of <u>lost</u> electrons.	Carry negative charges equal to number of <u>gained</u> electrons.

(G.R) Magnesium ion carries 2 positive charges. Mg^{+2}

(W.h.if) The atom of Ca loses it's valence electrons.

↳ Because the number of positive protons exceeds يزيد The number of negative electrons by 2.

↳ it changes into positive ion (cation) carrying 2 positive charges.

*The atom of chlorine gain 1 electrons.

↳ it changes into negative ion (anion) carrying 1 negative charge.

تتعاى نذاكر انواع الروابط فى جدول أسهل

	Ionic bond	Covalent bond
Definition	it is a bond occurs between positive ion of metal and negative ion of non-metal.	it is a bond occurs between 2 atoms of The same nonmetal or different non-metal.
Occurs by	<u>lose or gain electrons.</u>	<u>share electrons.</u>
produce	always produce ionic Compound only. (G.R)	may produce element <u>or</u> Compound. (G.R)
	↳ Because it occurs between 2 different element Like positive ion of metal and negative ion of non metal.	↳ Because it may occur between 2 atom of the same element <u>or</u> between different non metal elements.
Examples	$\text{Na} \cdot + \cdot \ddot{\text{Cl}} : \rightarrow \text{Na}^+ \text{Cl}^-$ $\text{Mg} \cdot + \cdot \ddot{\text{O}} : \rightarrow \text{Mg}^{+2} \text{O}^{-2}$ "خلى بالك مش بتحصل ابدأ ما بين :-" 2 similar metals or 2 similar non metals.	$\text{H} \cdot + \cdot \ddot{\text{Cl}} : \rightarrow \text{H} - \text{Cl}$ has <u>3</u> Types:- 1- single bond: ex H_2O $\text{H} - \ddot{\text{O}} - \text{H}$ 2- double bond: ex O_2 $\ddot{\text{O}} = \ddot{\text{O}}$ 3- Triple bond: ex N_2 $\ddot{\text{N}} \equiv \ddot{\text{N}}$

(4)

تتأى نكمل باقى الجدول وناخذ اسئلة g.R عليهم من التقييات: والمطاصر:-

Ionic bond

{G.R} The bond in the sodium chloride is ionic bond.

→ Because sodium chloride is formed due to electrostatic attraction between positive sodium ion and negative chloride ion and forming ionic compound.

{G.R} Ionic bond results in molecules of compound only not element molecules.

→ Because ionic bond occurs between different elements like cation of metal and anion of non metal.

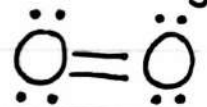
Covalent bond

{G.R} The bond in the hydrogen chloride is covalent bond.

→ Because hydrogen chloride is formed due to sharing hydrogen and chlorine atom with one electron and forming covalent compound.

{G.R} The bond in oxygen molecule is double covalent bond.

→ Because each oxygen atom share 2 electrons to form 2 pairs of electrons and forming double bond.



{G.R} The bond in nitrogen molecule is triple covalent bond.

→ Because each nitrogen atom share 3 electrons to form 3 pairs of electrons and forming triple bond.



(5)

فاصل G-R مودة في Covalent

G.R. The bond in water molecule is single Covalent bond.

Because oxygen share with 2 electrons and each hydrogen atom share with 1 electron to form single Covalent bond



طب لو جاني سؤال أقارن بين ال bonds هكتب ايه بالظبط > تعالى نعمل جدول صغير نلخص فيه المقارنه (الجدول الكبير للمذاكرة بالتفصيل)

	Ionic bond	Covalent bond
Definition	it is a bond occurs between positive ion of metal and negative ion of non metal	it is a bond occurs between 2 atoms of the same non metal or different non metal elements.
Occurs by	lose or gain electrons.	share electrons.
Produce	Ionic compound only	elements or compound
Examples	NaCl	H ₂ > HCl

ناقص لنا في الدرس ده مقارنه مودة اوي بين Ionic and Covalent Compound
تعالى نذاكرهم في جدول لوحدهم



⑥

Compare between ionic and Covalent Compounds هذه سؤال من التقييمات

	Ionic Compounds	Covalent Compounds
1. Solubility in Water	<u>dissolve</u> in water	<u>don't dissolve</u> in water.
2. Melting point	High	Low
3. boiling point	High	Low
4. Conducting electricity	Conduct electricity.	don't Conduct electricity.
5. Example	NaCl	HCl

G.R Ionic Compound is neutral charge. نقيات ←

→ Because in ionic compound, the number of positive charges equal the number of negative charges.

"Carbon atom"

1 G.R Carbon atom has unique properties.

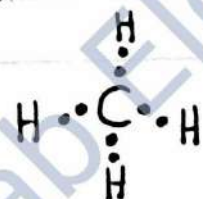
→ Because it can bind with each other in organic compounds to form straight chain, cyclic structure and branched chain.

* straight chain: ---C---C---C---

* branched chain $\begin{array}{c} \text{---C---C---C---} \\ | \\ \text{---C---} \end{array}$

* Cyclic structure $\begin{array}{c} \text{C} \\ / \quad \backslash \\ \text{C} \quad \text{C} \\ \backslash \quad / \\ \text{C} \end{array}$

* Methane CH_4 : is the simplest molecule of organic compound. It has 1 Carbon atom bonded to 4 hydrogen atoms



Unit 2 Lesson 1

* Electric Force *

G.R. Electrostatic is called by this name

Because it is the charge that accumulate on the surface of object when lose or gain electrons.

2) charging by friction:-

it is a process of charging 2 objects by rubbing them together.

G.R. you feel slight electric shock when touch a metal door after walking barefoot on the carpet.

Because when you touch handle, the charge that formed on the body due to friction with the carpet will be discharged.

G.R. Hearing cracking sound when taking off woolen clothes in winter.

Because of discharging the electric charges that formed due to friction between my body and woolen clothes.

3) Objects that can be charged by static electricity are:-

Electric Conductors

Materials that allow electric charges to flow through them

ex Carbon, iron, Copper, aluminium

Electric insulators

Materials don't allow electric charges to flow through them.

ex: glass, wood, silk, wool

بعض خالي بالان في المواد الموصلة لدرج الجز المشحون يكون مغزول عنان الشحنات متهربش

G.R. small paper scrapes are not attracted to the copper rod when rubbed with wool.

Because copper is good conductors of electricity so it must be insulated to prevent leakage of charges.

4) "Electrostatic series:-"

It is the arrangement of materials according to the easiness of losing electrons when rubbed together. ← حفظ



لذلك يكون حائط الترتيب ده علمان

اعرف بين هيتي (+) ومين (-)

W.h.if Rubbing glass with peice of wool.

→ The glass aquires positive charges and wool aquires negative charges.

G.R When ebonite rod is rubbed with cotton, cotton aquired positive charge and ebonite aquired negative charge.

→ Because cotton is before ebonite so it loses electrons and become positive charge while ebonite is after cotton so it gains electrons and become negative charge.

5) There is repulsion force between same electric charges.

There is attraction force between different electric charges.

دائماً بيسالن فيها W.h.if :-

الاسئلة دي من التيارات

W.h.if Rubbing 2 ebonite rod with peice of silk and bring them close to each other.

→ they will repel each other because they have the same negative charge.

W.h.if Hanging an ebonite rod after rubbing it with silk and bringing a glass rod close after rubbing it with silk.

→ they will attract to each other because ebonite has negative charge and glass has positive charge

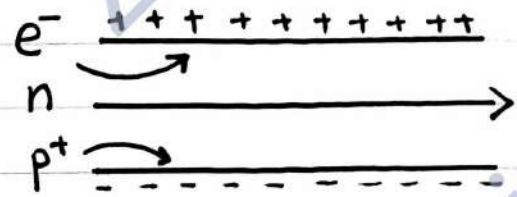
W.h.if Hanging an ebonite rod after rubbing it with silk and bringing a glass rod close without rubbing it.

→ Nothing will happen, they will not attract or repel.

W.h.if Touching the disk of a charged electroscope by hand.

→ The charges that accumulate on the electroscope will discharge through the body.

6) 3 beams of subatomic particles in electric field:-



electrons will move to positive plate, because different charges attract to each other.

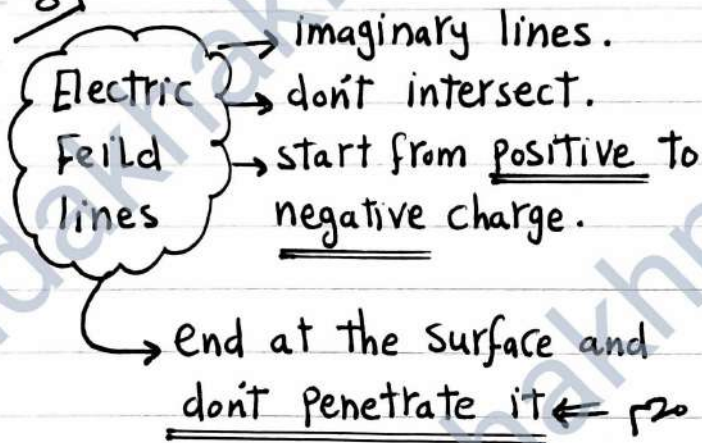
Protons will move to negative plate, because different charges attract to each other.

Neutrons will pass in straight line, because it has neutral charge.

7) Electric field:- it is a region of space around electric charge where its effect appears.

"Electric field lines" - they are lines that represent the path of small moving positive charge placed in an electric field.

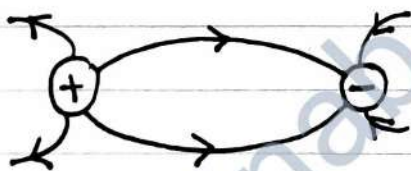
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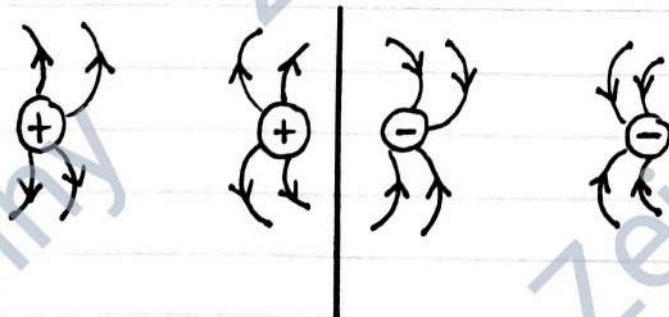
لازم اكون يعرف رسمها وخطي بالك من
اتجاه السهم طالع من (+) رايح (-)
* Single charge *



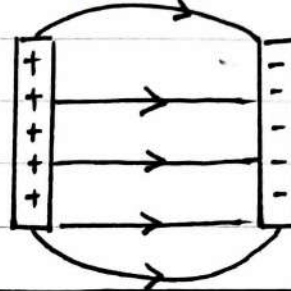
* 2 different charges *



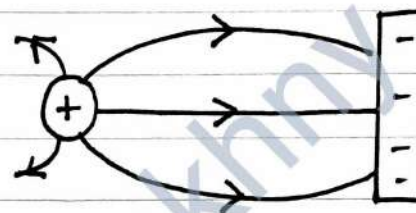
* 2 similar charge *



* 2 metal plate with different charges *



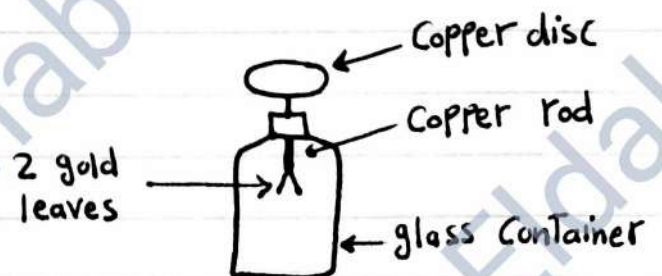
* charged plate and opposite charge *



9 * ElectroScOpe *

• it is a device used to determine if the object charged and determine the type of charge.

- determine the type of charge.
- detect the electric state of object.
- Compare the magnitude of charges on charged objects.



من التقييات

W.h.if

* approaching positively charged glass rod from negatively charged electroscope.

→ The divergence of 2 leaves will decrease

* approaching negatively charged ebonite rod from negatively charged electroscope.

→ The divergence of 2 leaves will increase.

"Charging by Contact"

→ it is the process of charging uncharged object by its contact with charged object.

→ it happens without rubbing

10

الدرس ده في عالم واحد بس هو:-

Coulomb

→ he formulated the law of describing the force between charged particles. and this law is called:-

Colomb's Law = inverse square Law.

→ He studied the development of electromagnetic theory.

→ The weak electric charges are measured with Coulomb meter.

→ ده جهاز

→ The electric charges are measured in Coulomb unit.

G.R. After the paper scrapes attract to the plastic comb, it will fall off after few minutes.

→ Because the paper scrapes take the same charge of the comb after contact with it so it will cause repulsion between them so it will fall.

11

تعاك نجمع من الدرس ده كل ال

* Life applications *

• Electrostatic plating *

(G.R) Electrostatic plating is preferred for painting metals.

↳ Because it makes the paint layer is even layer and reduce paint waste.

لوسالن برده اكتب مميزات :-
What the advantages of electrostatic plating. نفس الاجابه

• Metal chain *

(G.R) Fuel Transport Vechiles have metal chains dangles to touch the ground.

↳ to discharge the electric charges generated by the friction of fuel with fuel tank and to prevent fuel Combustion.

• Lightning rod •

↳ it is a metal rod which its lower end fixed to the ground and upper end is pointed.

(G.R) Lightning rod has important protective role.

↳ to protect buildings from Lightning strikes by discharge the electric charge from clouds to pass it to the ground.

Lesson 2 "Magnetism"

1- The natural magnet is called (Lodestone) rock.

2- Any magnet has 2 poles:-
 • South pole (S) → blue color.
 • Red pole (N) → red color.

3- Artificial magnet has many shapes
 • Bar magnet.
 • Horse shoe magnet.
 • Needle magnet.
 • Ring magnet.

4- (W.h.if) Single magnet is divided into several parts.

→ Each of part will form new magnet with 2 poles.

5- (G.R) Cobalt and nickel are magnetic materials.

→ Because they are attracted to the magnet.

6- (G.R) Aluminum and silve are non-magnetic materials.

→ Because they are not attracted to the magnet.

7- (W.h.if) A magnet is closed to mixture of Copper fillings and Iron fillings.

→ only iron fillings are attracted to the magnet.

8- (W.h.if) A magnet is dipped into iron fillings.

→ Iron fillings will attract to the magnet with high density at the poles and this density decrease at the middle.

(G.R) Iron fillings gather in large amount at the poles of magnet.

→ Because the magnetic force is the strongest at the poles and decrease at middle so iron fillings attract with large amount at poles.

9- Forensic and criminal investigation use magnetic brush and iron fillings to reveal unclear finger prints

↳ Because iron fillings stick to the finger prints to make them visible.

10- Earth acts as a giant magnet.

11- W.h.if magnet is suspended freely from its center.

↳ The north pole of the magnet points to geographical north pole of earth and the south pole of magnet points to the geographical south pole of earth.

12- جلی بالان :-

• geographical north pole = magnetic south pole of earth.

• geographical south pole = magnetic north pole of earth.

13- "The Compass"

• It is old tool used to determine the Earth's geographical directions.

• G.R Compass cases are made of copper, plastic not iron.

↳ To prevent the attraction between the needle and the box material which can affect its movement.

14- Mention what is meant by:-
"Law of attraction and repulsion"

↳ Similar (Like) magnetic poles repel each other and different (unlike) magnetic poles attract each other.

15- W.h.if Bringing a north pole of magnet close to north pole of freely suspended magnet.

↳ They will repel each other, because like poles repel.

16- (W.h.if) Bringing north pole close to south pole of another freely suspended magnet.

→ They will attract to each other, because unlike poles attract.

17- "Magnetic field"

is the region of space around the magnet and its magnetic force appears in it.

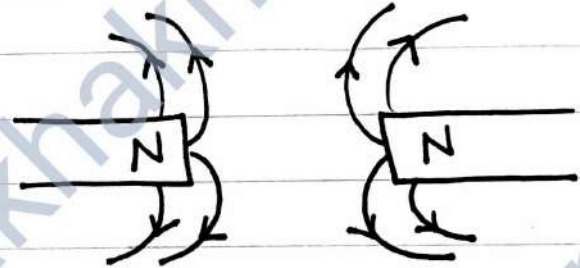
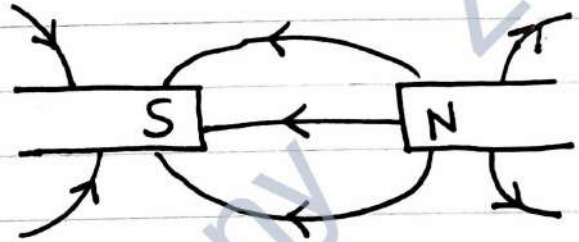
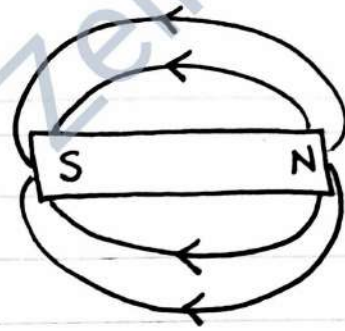
18- "Magnetic field lines"

- They are an imaginary lines that represent the magnetic field.

- They don't intersect.

- They start from North pole and end at South pole.

بالرسم تعرف ترسم وخطي باليك
ابدأ من North دائماً، السور
طالع من North رايح لا South



19- (G.R) A moving magnet below glass plate can move the pins

→ Because the magnetic field extends through the glass and attract the pins.

20- خلی بالک ان
The force between 2 magnet may be attraction or repulsion
But between magnet and magnetic materials is always attraction.

L3 - Gravitational Force

1. is the force that pull objects down Toward the Center of earth

(G.R) All objects fall down ward To the Center of The Earth.

↳ Because of gravitational force of Earth.

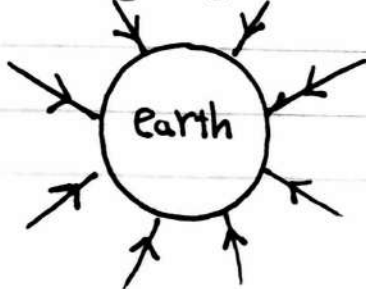
2. "Gravitational feild"

• is the space in wich earth gravitational force affects on objects with attraction force To the Center of earth.

3. "Gravitational feild lines"

• They are lines that represent the Earth gravitational force.

خطى جاذبية ان المجر راجع لمركز الارض



4. it depends on 2 factors:-

- * Masses of 2 objects.
- * distance between 2 objects.

5. When the mass increases, The gravitational force increases.

(W.h.if) increasing The mass of an object relative To The gravity between Them.

↳ the gravity will increase when The mass increase.

6. When the distance increases, The gravitational force decreases.

(W.h.if) The distance between 2 objects increase relative To The gravity between Them.

↳ The gravity will decrease when The distance increases جليعا والعكس صحيح .

7. The gravitational force between 2 objects is equal magnitude but in opposite directions.

8. "Tidal phenomenon"

• occurs because of gravitational force between moon and earth.

• occurs Twice daily = every 12 hours.

كان في سؤال في امتحان محاضره وسأل
هيجل كام مرة في الاسبوع ؟
 $2 \times 7 = 14$ times.

• Water reach the heightest (peak) level when the moon is New moon or Full moon.

• Used to generate electricity as Renewable Resource.

• used to clean water of seas and oceans from impurities.

• In The Bay of Fundy in Canada, The difference between elevation and recession of water is 19 meters

9. Black holes

• G.R. formation of black holes.

↳ due to Collapse of massive star at the end of its life.

• it has immense gravity جاذبيه منخفه so that even light can't escape from them.

10. "Orbital motion"

• is the rotation of object around another object in curved path due to gravitational force between them.

• Such as;—

* Motion of earth around the sun.

* Motion of moon around the earth.

* Motion of satellites around earth.

* Motion of electrons around the nucleus and this is the weakest gravitational force.

11. Mass and weight

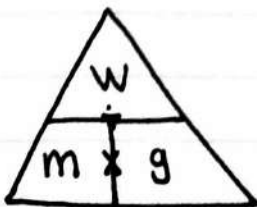
* Mass *

- is the amount of matter in object.
- measured by balance.
- measuring unit is K.g.
- is Constant (doesn't change from place to another) ← دائماً بتتساها

* Weight *

- is the gravitational force that earth exert on the object.
- measured by spring balance = Newton meter.
- measuring unit is Newton (N).
- change from place to another.
- $\text{Weight} = \text{Mass} \times \text{gravitational field intensity}$

$$W = M \times g.$$



G.R) The weight of an object at earth is always greater than its mass.

→ Because the weight is calculated by multiplying mass and gravitational field intensity.

$$W = m \times g.$$

طبعا لما يجيلي مسألة :-

- ارسو المثلث ده .
- أشوف طالب من احسب ايه واخيه بايدي والباقي عمله اما ضرب اوقته
- متنشاش تكتب ال unit أما $\text{Kg} \rightarrow \text{N}$ على حسب المطلوب في السؤال.

G.R) The mass of an object doesn't change while the weight change from place to another.

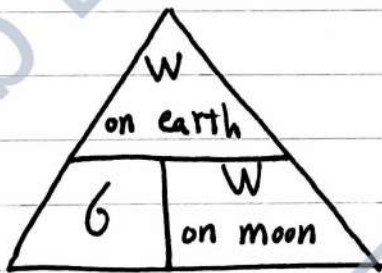
→ Because the mass is Constant that doesn't change, while the weight changes due to change the gravitational field acting on it.

12_ Weight on Earth and moon

• The weight of an object on earth is greater than on moon

• The weight of an object on moon is less than on earth (GR)

→ Because the moon gravitational field intensity is $\frac{1}{6}$ the earth gravitational field intensity.



لا بده لوجاي مساله هتخبر المطلوب
بايدي والباقي اعمله ضرب اوقسمه بس
في تركايه كده بتلخبطك :-
انه يدين ال mass ويقل احسب الوزن
على القمر ، لازم الاول اجيب الوزن
على الارض طب اجيبها اراي يا ميس ؟
هقلك من الصلت الدفات

$$W = m \times g.$$

تعاى ناخذ مثال :-

Calculate the weight of an object on the moon if its mass = 60 kg.

الاول لازم احسب الوزن على الارض

$$W = m \times g$$

$$W \text{ on earth} = 60 \times 10 = 600 \text{ N}$$

اجيب بقى الوزن على القمر

$$W \text{ on moon} = \frac{W}{6} = \frac{600}{6} = 100 \text{ N}.$$

طب لو خللك احسبى ال mass على

الارض هتبقى كام ؟؟

الاجابه عندك في السؤال اصلا لان

ال mass ثابتة مش بتتغير من

مكان لمكان

W.h.if Transferring of an object from moon surface to earth surface relative to its mass.

→ The mass doesn't change because it is constant.

13- When the object move away from earth surface, the weight will decrease

14- When the object move closer to earth surface, the weight will increase.

(G.R) The weight of an object differ from planet to another

→ Because the gravitational field intensity change from planet to another.

(G.R) An object has no weight in outer space.

→ Due to the absence of gravity in outer space.

عندنا هنا عالم واحد وهو
Newton:- discovered that all objects in universe attract each other.

"بالنجاح والتوفيق"

15- Field force, Contact force

~ . ~ . ~ . ~ . ~ .

* Field forces:- They are forces that act on object through their field without contact.

* Contact field:- they are forces that act on object by contact with each other.

Mention examples of Field Forces:-

- gravitational force.
- Magnetic force.
- electrostatic force.

Mention examples of Contact force.

- Friction force.
- Collision force.
- Elasticity force.

(G.R) Collision force is Contact force while gravitational force is field force.

→ Because Collision force act on object when they touch each other but gravitational force act on object through its field without contact.

حمل الآن

مجاناً وحصرياً

المراجعة رقم (3)

اختبار شهر نوفمبر



Final Revision on unit 2

1) Choose the correct answer:

- 1- Scientist.....formulated the inverse square law that describes the electric forces between charged particles.
a) Dalton b) Coulomb c) Moseley d) Rutherford
- 2- Among the electrical conductors is.....
a) carbon. b) glass. c) ebonite. d) wood.
- 3- All of the following materials lose electrons when rubbed with a piece of wool except.....
a) wood. b) glass. c) silk. d) paper.
- 4- In the electrostatic series, all of the following materials precede wool except.....
a) silk b) glass c) ebonite d) wood
- 5-rod gains electrons when rubbed with a piece of cotton.
a) Silk b) Glass c) Ebonite d) Wood
- 6- A rod made of..... is charged with a static charge when rubbed and provided that it has insulated hand held part.
a) wood b) glass c) ebonite d) iron
- 7-acquires a positive charge when rubbed with silk.
a) Wool b) glass c) ebonite d) paper
- 8- All the following describe the electric field lines, except that they.....
a) are imaginary lines. b) start at the positive charge.
c) don't penetrate metallic surfaces. d) are intersecting lines.
- 9- Electric field lines are almost parallel between.....
a) a negatively charged metal plate and a negative charge.
b) a positively charged metal plate and a positive charge.
c) a positive charge and a negative charge.
d) a positively charged metal plate and a negatively charged metal plate.
- 10- When the leaves of the electroscope are applicable, the charge of the electroscope is.....charge.
a) positive b) negative c) neutral d) unknown

- 11-** Fuel tankers are grounded with chains made of.....
a) wood. b) plastic. c) iron. d) synthetic leather.
- 12-** All the following metals are attracted to a magnet, except.....
a) iron. b) nickel. c) cobalt. d) aluminum.
- 13-** The strength of the magnet increases in the..... of the magnet.
a) middle b) edge c) side d) surface
- 14-** All the following are examples of field forces except.....
a) Gravity b) Electromagnetic c) Friction d) Electrostatic
- 15-** All the following are examples of contact forces except.....
a) Gravity b) Collision c) Friction d) Elasticity
- 16-** The scientist discovered that all material objects attract each other.
a) Rutherford b) Newton c) Coulomb d) Moseley
- 17-** The force which is responsible for the stability of the objects and rainfall on the surface of the earth.
a) Gravity b) Electromagnetic c) Friction d) Electrostatic
- 18-**phenomenon is a natural phenomenon that occurs due to the gravitational attraction force between the Moon and Earth.
a) Rainfall b) Tidal c) Black holes d) Shadow
- 19-** The weakest field force in any atom is the force between the nucleus and electrons.
a) gravitational b) Electromagnetic c) repulsion d) Electrostatic
- 20-**is used to measure the weight of objects.
a) Thermometer b) Newton meter c) scale d) Coulomb meter
- 21-** The unit of gravitational field intensity measurement is.....
a) Kilogram b) Newton/kg c) Newton d) Coulomb
- 22-** The ratio between the weight of an object at the base of a mountain to its weight at its top is.....one.
a) greater than b) less than c) equal to d) no correct answer
- 23-** An object of mass 5 kg, so its weight on Earth's surface equals.....
a) 5 N b) 50 N c) 40 N d) 50 Kg

24- The ratio between an object's weight on Earth to its weight on the Moon is.....

- a) 1:1 b) 1:6 c) 6:1 d) 1:2

25- If the gravitational field intensity at a certain position is 10 N/kg, the mass of an object weighing 490 N at Earth's surface is.....

- a) 490 kg b) 490 N c) 49 N d) 49 Kg

2) Complete the following statements:

- 1-** An example of electrically conducting materials is, while an example of electrically non-conducting materials is
- 2-** The magnitude of static electric charges is measured by a device called.....
- 3-** Objects can be charged with static electric charges by or.....
- 4-** Theseries is the arrangement of some materials according to the ease of losingfrom them.
- 5-** From the rubbing electrostatic materials are,and cotton.
- 6-** An object that loses electrons is charged with acharge, while an object that gains electrons is charged with acharge.
- 7-** When rub ebonite rod with a piece of wool, the rod acquires electric charge, while the piece of wool acquires electrical charge.
- 8-** The electroscope consists of a metal disc,container,rod and twoleaves.
- 9-** When the charge of the tested object is opposite to the electroscope charge, the gold leaves divergence
- 10-** Different electrical charges, while similar electrical charges
- 11-** In the presence of an electric field between two plates, protons are deflected towards theplate, while electrons are deflected towards theplate.
- 12-** The electroscope device is known as

- 13- During electrostatic plating, the required painted object is charged with..... electric charge, while the spray paint is charged with a.....electric charge.
- 14- A magnet has two poles which areand.....
- 15- From the forms of industrial magnets are, horseshoe magnet,or magnetic ring.
- 16- The North magnetic pole is represented by the symbol, while the South magnetic pole is represented by the symbol
- 17- Themagnetic pole is marked mainly by red colour, while themagnetic pole is marked mainly by blue colour.
- 18-is from magnetic materials, whileis from non-magnetic materials.
- 19- The attraction force of a magnet is the strongest at, and it decreases when approaching to theof the magnet.
- 20- Forensic and criminal investigation experts usebrush andfilings in criminal investigations to reveal the unclear
- 21- When a magnet is suspended freely, its south pole points to the geographicalpole of the Earth.
- 22- Anforce arises between the north pole of a magnet and the south pole of another magnet.
- 23- The Earth acts as a giant, where the south pole of Earth's magnet represents the geographicalpole, while its north pole represents the geographicalpole of the earth.
- 24-is an ancient tool used to determine the four geographical directions.
- 25- Compass consists of a free-moving fixed at its.....
- 26- The area surrounding the magnet where the effects of its magnetic force appear is called
- 27- Magnetic field lines starts from thepole and end at the.....pole.
- 28-field lines end at the metallic surfaces, while field lines penetrate delicate surfaces.

- 29- Forces acting on objects are generally classified into andforces.
- 30-forces are those that act on objects upon contact, such asforce andforce.
- 31- The space in which the Earth's gravitational force affects material objects with an attraction force towards the Earth's center is called Earth's
- 32- Earth's gravitational force is expressed by Earth's
- 33- From the factors affecting the gravitational force between two objects is theof two objects and thebetween the centers of the two objects.
- 34- The greater the mass of the two objects, thethe force of attraction between them.
- 35- The gravitational forceas the distance between the centers of the two objects increases.
- 36- Tides are most active when the moon is shaped like either..... or
- 37- The phenomenon ofoccurs in the Bay of Fundy in Canada, and the difference between the height and low water levels can reach up tometers.
- 38-are regions in the space formed due to the collapse of a massive star at the end of its life.
- 39- Black holes are characterized by immenseforce, so that evencan't escape from them.
- 40- An example of orbital motion is the movement ofaround.....
- 41-force may be either attractive or repulsive between two charges, whileforces are only attractive forces.
- 42- Mass is measured in, while weight is measured in
- 43- Theof objects become zero in outer space, while theirremain constant.
- 44- The Earth's gravitational field intensityas we move away from the Earth's center.

- 45- An object its weight on the Earth's surface equals 60 newton, so its mass equals.....kg, when Earth's gravitational field intensity is 10 N/kg.
- 46- An object mass on the Earth's surface equals 50 kg, so its mass on moon's surface equalskg.

3) Write the scientific term:

- 1- The charges accumulated on the surfaces of objects when they lose or gain electrons.
- 2- The measuring unit of electric charge.
- 3- A device used to measure weak electric charges.
- 4- The process of charging two uncharged objects by rubbing them together.
- 5- The arrangement of materials according to the easiness of losing electrons when they are rubbed together.
- 6- The process of charging an uncharged object by another charged object due to their contact.
- 7- The region of space around an electric charge, in which its effect appears.
- 8- Imaginary lines that show the path taken by a small free moving positive charge
- 9- A device used in detecting the electric state of an object.
- 10- A system used to protect structures and buildings from lightning strikes.
- 11- A natural stone that has the ability to attract objects made of iron.
- 12- Materials that are attracted to the magnet.
- 13- Materials that are not attracted to the magnet.
- 14- Similar poles repel and different poles attract.
- 15- The force that pulls all objects downward towards the Earth's center.
- 16- The unit of force measurement.
- 17- The rotation of any object in space around another central object in a curved path due to the gravitational attraction force between them.
- 18- The amount of matter in an object.
- 19- The gravitational force that Earth exerts on the object.

4) What is meant by:

1- The mass of a ball is 20 kg.

➤

2- The weight of a person on Earth's surface is 500N.

➤

3- The gravitational force that Moon exerts on an object is 60N.

➤

5) Put (√) or (x):

1- Paper scraps are attracted to an iron rod held by hand. ()

2- The same material can be charged with either a positive or a negative charge. ()

3- The charge on the rubbed object varies depending on the type of the rubbing material. ()

4- Electric power lines start from the positive charge and end at the negative charge. ()

5- When a glass rod is rubbed with a piece of silk, the force lines start from the piece of silk. ()

6- Two ebonite rods repel each other when rubbed separately with a piece of wool. ()

7- Both glass and wood acquire the same electric charge when each of them is rubbed separately with a piece of silk. ()

8- Cotton always acquires positive charges when used to rub other materials. ()

9- Electric force lines end at the surfaces of charged metal objects and don't penetrate them. ()

10- When a piece of synthetic leather rubbed with wool is brought close to the disc of a negatively charged electroscope, the leaves divergence increases. ()

11- The disc and leaves of the electroscope are made of conductive materials. ()

12- The electroscope can be charged by contact. ()

13- The density of iron filings is the greatest at the middle of the magnet. ()

14- The mutual magnetic force between a magnet and a magnetic material within its field is a repulsive force. ()

- 15- The compass needle is deflected when a magnet is brought close to it. ()
- 16- The magnetic field lines crowd together at north and south poles. ()
- 17- Friction forces are field forces, while gravitational force is contact force. ()
- 18- Gravitational force is a mutual force between two objects, acting with equal magnitude in same direction. ()
- 19- The rotation of electrons around the nucleus of an atom is an example of orbital motion. ()
- 20- The phenomenon of tides is a result of the gravitational force between the Earth and the Sun. ()
- 21- The phenomenon of tides occurs periodically once every 24 hours. ()
- 22- The weight of an object doesn't change from one place to another. ()
- 23- The larger the mass of an object, the greater its weight. ()
- 24- The moon's gravitational pull on an object is greater than Earth's pull on it. ()
- 25- An object weight on Earth differs from its weight on Jupiter. ()
- 26- An object weight at the base of a mountain is greater than its weight at the top of it. ()

6) Correct the underlined words:

- 1- When we rub a rod of ebonite with silk protons transferred from silk to ebonite.
- 2- Electric force lines are real lines that do not intersect with each other.
- 3- Electrons are neutrally charged particles that are not deflected by the effect of an electric field.
- 4- The gold leaves become diverged when the electroscope is uncharged.
- 5- The dangled metal chain discharges the accumulated electric charges on clouds.
- 6- When a magnet is brought close to a piece of cobalt, a repulsive force arises between them.
- 7- Electric field lines are imaginary lines representing the strength of the magnetic field.
- 8- Contact forces affecting certain dimension such as gravitational forces and electromagnetic forces.
- 9- The force affecting falling of an apple to the ground is the friction force.

- 10- The phenomenon tides occur once daily.
- 11- The phenomenon of tides can be used to generate light as one of the renewable energy sources.
- 12- The phenomenon of black holes is used to purify the water bodies from impurities.
- 13- Friction force is the force of attraction between any object moving in space along a curved path around central object.
- 14- Black holes are formed due to the collapse of a massive planet at the end of its life.
- 15- The mass of an object changes from one place to another.
- 16- An object weight increases as it rises above Earth's surface.
- 17- An object weight on the moon is equal to its weight on Earth.
- 18- If the mass of an object is 500 g, and the gravitational field intensity at a certain position is 10 N/kg, then its weight is 5000 kg.

7) Cross out the odd word and write the scientific term of others:

- 1- Wood – Copper – Ebonite – Silk.
- 2- Iron – Nickel – Cobalt – Gold.
- 3- Magnetic needle – Bar magnet – Lodestone – Magnetic ring.
- 4- Friction force - Electrostatic force - Magnetic force - Gravitational force.
- 5- Collision force - Magnetic force - Friction force - Elasticity force.

8) Mention the difference between (compare):

- 1- Electric attraction force and electric repulsion force.

Electric attraction force	Electric repulsion force
.....	
.....	

- 2- Charging by rubbing and charging by contact.

Charging by rubbing	Charging by contact
.....	
.....	

3- Electric field lines and magnetic field lines.

Electric field lines	Magnetic field lines
.....	
.....	
.....	
.....	

4- Field forces and contact Forces.

Field Forces	Contact Forces
.....	
.....	
.....	
.....	

9) Give an example for:

- 1- Electrical conductor metal.
- 2- Electrical insulator material.
- 3- Matter loses electrons when rubbed with a piece of wool.
- 4- Magnetic material.
- 5- Non-magnetic material.
- 6- Field Force.
- 7- Contact Force.
- 8- Orbital motion.

10) Give reason for:

- 1- The electrostatic electricity is called static electricity.
➤
- 2- The attraction of paper pieces to an ebonite rod rubbed with silk.
➤
- 3- Small paper scraps are not attracted to the copper rod when rubbed with wool.
➤
- 4- The glass rod becomes positively charged when rubbed with silk.
➤

5- Touching the electroscope disc with the hand before using it.

➤

6- Metal chains are hanged from fuel transport vehicles and touch the ground.

➤

7- It is preferable to paint metals using electrostatic painting method than other methods.

➤

8- The lightning rod has an important protective role.

➤

9- Nickel and cobalt are considered as magnetic materials.

➤

10- Aluminum and silver are non-magnetic materials.

➤

11- Compass box is made of copper or plastic and not of iron.

➤

12- Iron fillings are attracted in large amounts at each pole of the magnet.

➤

13- All objects fall downward to the Earth's center.

➤

14- There is a field of magnetic forces and no field of collision forces.

➤

15- The occurrence of tides phenomenon in the seas and oceans.

➤

16- The formation of black holes in the space.

➤

17- Satellites do not deviate from their orbits around Earth.

➤

18- An object's weight on Earth's surface is always greater than its mass.

➤

19- The weight of an object on the Earth's surface is greater than the weight of the same object on the Moon's surface.

➤

20- Object's weight changes from one planet to another.

➤

21- The object has no weight in the outer space.

➤

11) What are the results of (What happens...)?

1- Rub the ebonite rod with a piece of silk and bring them close to each other.

➤

2- Bringing a glass rod close to a freely suspended ebonite rod after rubbing each of them with silk.

➤

3- Rubbing a wooden rod with a piece of cotton.

➤

4- Touching a charged electroscope disc with your hand.

➤

5- Approaching a positively charged glass rod close to a negatively charged electroscope.

➤

6- Approaching a negatively charged ebonite rod close to a negatively charged electroscope.

➤

7- Dividing a single magnet into several parts.

➤

8- A magnet is brought close to a mixture of iron filings and silver.

➤

9- Dip a magnet in a box containing iron filings.

➤

10- A magnet is suspended freely from its middle.

➤

11- Bring the south pole of a magnet closer to the south pole of another freely suspended magnet.

➤

12- The absence of gravity.

➤

13- Increase in object mass. (Relative to gravitational force between them)

➤

14- Decrease of the distance between the two objects.

(Relative to the gravitational force between them)

➤

15- Transferring an object from the moon's surface to the Earth's surface.

(Relative to its mass and its weight)

➤

12) Problems:

1- Calculate the weight of an object its mass is 50 g at Earth's surface.

(Knowing that Earth's gravitational field intensity is 10 N/kg)

.....

.....

2- Calculate the Earth's gravitational pull on an object with a mass of 20 kg

(Knowing that Earth's gravitational field intensity is 10 N/kg)

.....

.....

3- An object has a mass equals 60 kg on the moon. Calculate:

a) Its mass on Earth's surface.

b) Its weight on Earth's surface.

c) Its weight on moon's surface.

(Knowing that Earth's gravitational field intensity is 10 N/kg)

.....

.....

4- Calculate the mass of an object on the moon if the earth's gravitational pull on it is 980 N and Earth's gravitational field intensity is 10 N/kg.

.....

.....

5- If an object weighs 20 N on the Moon and the gravitational field intensity on Mars is 3.7 N/kg. Calculate the object's weight on Mars.

(Knowing that Earth's gravitational field intensity is 10 N/kg)

.....

.....

.....

13) State one importance for each of the following:

1- Coulomb meter.

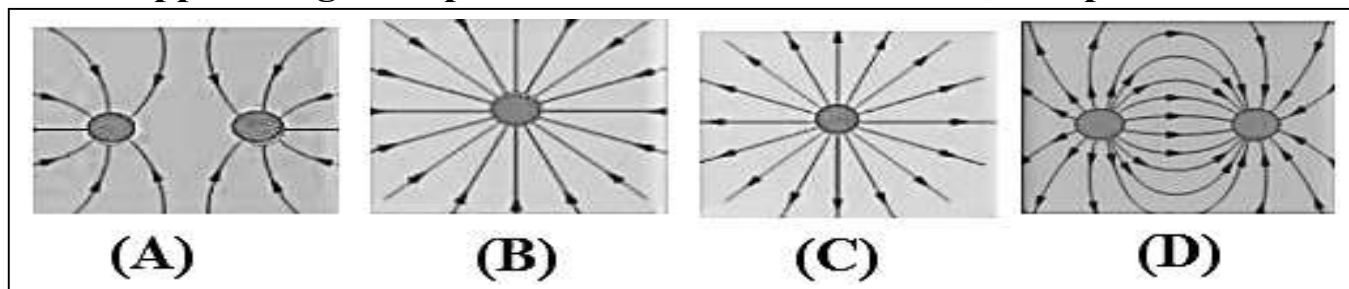
2- Lightning rod.

3- Electrostatic plating.

4- Gravitational force.

14) Study the following figures then answer:

1- The opposite figure represents the electric force lines, complete:



a) Figure represents the electric force lines for two similar charges, while figure represents the electric force lines for two different charges.

b) Figure represents the lines of electric force for a positive charge, while figure represents the lines of electric force for a negative charge.

2- The opposite figure represents one of the devices:

a) What is the name of the device?

➤

b) It is used for

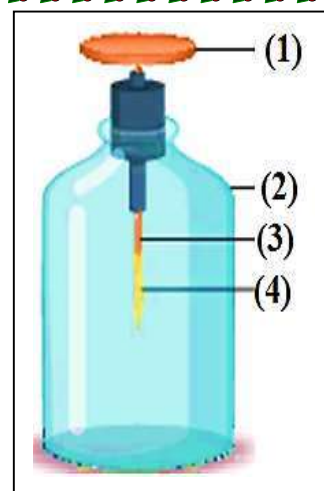
c) Write the labels in the opposite drawing:

(1)

(2)

(3)

(4)



d) In the opposite drawing the device is (charged – uncharged).

e) What happens if a charged object touches to the disc of this device?

➤

3- The opposite figure represents one of the devices:

a) What is the name of the device?

➤

b) It is used to

c) The box of this device made up of or



4- The opposite figure represents one of the devices:

a) What is the name of the device?

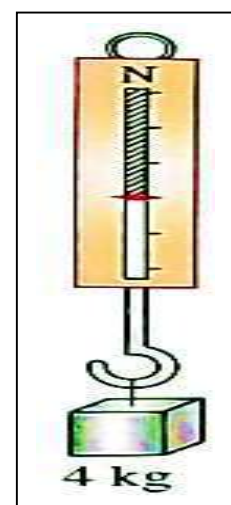
➤

b) It is used to

c) From the opposite figure, calculate the weight of the cube.

(Earth's gravitational field intensity is 10 N/kg)

➤



Final Revision on unit 2 (answered)

1) Choose the correct answer:

- 1- Scientist.....formulated the inverse square law that describes the electric forces between charged particles.
a) Dalton b) Coulomb c) Moseley d) Rutherford
- 2- Among the electrical conductors is.....
a) carbon. b) glass. c) ebonite. d) wood.
- 3- All of the following materials lose electrons when rubbed with a piece of wool except.....
a) wood. b) glass. c) silk. d) paper.
- 4- In the electrostatic series, all of the following materials precede wool except.....
a) silk b) glass c) ebonite d) wood
- 5-rod gains electrons when rubbed with a piece of cotton.
a) Silk b) Glass c) Ebonite d) Wood
- 6- A rod made of..... is charged with a static charge when rubbed and provided that it has insulated hand held part.
a) wood b) glass c) ebonite d) iron
- 7-acquires a positive charge when rubbed with silk.
a) Wool b) glass c) ebonite d) paper
- 8- All the following describe the electric field lines, except that they.....
a) are imaginary lines. b) start at the positive charge.
c) don't penetrate metallic surfaces. d) are intersecting lines.
- 9- Electric field lines are almost parallel between.....
a) a negatively charged metal plate and a negative charge.
b) a positively charged metal plate and a positive charge.
c) a positive charge and a negative charge.
d) a positively charged metal plate and a negatively charged metal plate.
- 10- When the leaves of the electroscope are applicable, the charge of the electroscope is.....charge.
a) positive b) negative c) neutral d) unknown

- 11- Fuel tankers are grounded with chains made of.....
a) wood. b) plastic. c) iron. d) synthetic leather.
- 12- All the following metals are attracted to a magnet, except.....
a) iron. b) nickel. c) cobalt. d) aluminum.
- 13- The strength of the magnet increases in the..... of the magnet.
a) middle b) edge c) side d) surface
- 14- All the following are examples of field forces except.....
a) Gravity b) Electromagnetic c) Friction d) Electrostatic
- 15- All the following are examples of contact forces except.....
a) Gravity b) Collision c) Friction d) Elasticity
- 16- The scientist discovered that all material objects attract each other.
a) Rutherford b) Newton c) Coulomb d) Moseley
- 17- The force which is responsible for the stability of the objects and rainfall on the surface of the earth.
a) Gravity b) Electromagnetic c) Friction d) Electrostatic
- 18-phenomenon is a natural phenomenon that occurs due to the gravitational attraction force between the Moon and Earth.
a) Rainfall b) Tidal c) Black holes d) Shadow
- 19- The weakest field force in any atom is the force between the nucleus and electrons.
a) gravitational b) Electromagnetic c) repulsion d) Electrostatic
- 20-is used to measure the weight of objects.
a) Thermometer b) Newton meter c) scale d) Coulomb meter
- 21- The unit of gravitational field intensity measurement is.....
a) Kilogram b) Newton/kg c) Newton d) Coulomb
- 22- The ratio between the weight of an object at the base of a mountain to its weight at its top is.....one.
a) greater than b) less than c) equal to d) no correct answer
- 23- An object of mass 5 kg, so its weight on Earth's surface equals.....
a) 5 N b) 50 N c) 40 N d) 50 Kg

24- The ratio between an object's weight on Earth to its weight on the Moon is.....

- a) 1:1 b) 1:6 c) 6:1 d) 1:2

25- If the gravitational field intensity at a certain position is 10 N/kg, the mass of an object weighing 490 N at Earth's surface is.....

- a) 490 kg b) 490 N c) 49 N d) 49 Kg

2) Complete the following statements:

- 1- An example of electrically conducting materials is iron, while an example of electrically non-conducting materials is glass.
- 2- The magnitude of static electric charges is measured by a device called coulomb meter.
- 3- Objects can be charged with static electric charges by rubbing or contact.
- 4- The electrostatic series is the arrangement of some materials according to the ease of losing electrons from them.
- 5- From the rubbing electrostatic materials are silk, wool and cotton.
- 6- An object that loses electrons is charged with a positive charge, while an object that gains electrons is charged with a negative charge.
- 7- When rub ebonite rod with a piece of wool, the rod acquires negative electric charge, while the piece of wool acquires positive electrical charge.
- 8- The electroscope consists of a metal disc, glass container, copper rod and two gold leaves.
- 9- When the charge of the tested object is opposite to the electroscope charge, the gold leaves divergence decreases.
- 10- Different electrical charges attract, while similar electrical charges repel.
- 11- In the presence of an electric field between two plates, protons are deflected towards the negative plate, while electrons are deflected towards the positive plate.
- 12- The electroscope device is known as electric detector.

- 13- During electrostatic plating, the required painted object is charged with negative electric charge, while the spray paint is charged with a positive electric charge.
- 14- A magnet has two poles which are north and south.
- 15- From the forms of industrial magnets are bar magnet, horseshoe magnet, magnetic needle or magnetic ring.
- 16- The North magnetic pole is represented by the symbol N, while the South magnetic pole is represented by the symbol S.
- 17- The North magnetic pole is marked mainly by red colour, while the South magnetic pole is marked mainly by blue colour.
- 18- Iron is from magnetic materials, while aluminum is from non-magnetic materials.
- 19- The attraction force of a magnet is the strongest at poles, and it decreases when approaching to the middle of the magnet.
- 20- Forensic and criminal investigation experts use magnetic brush and iron filings in criminal investigations to reveal the unclear fingerprints.
- 21- When a magnet is suspended freely, its south pole points to the geographical south pole of the Earth.
- 22- An attractive force arises between the north pole of a magnet and the south pole of another magnet.
- 23- The Earth acts as a giant magnet, where the south pole of Earth's magnet represents the geographical north pole, while its north pole represents the geographical south pole of the earth.
- 24- Compass is an ancient tool used to determine the four geographical directions.
- 25- Compass consists of a free-moving magnetic needle fixed at its pivot.
- 26- The area surrounding the magnet where the effects of its magnetic force appear is called magnetic field.
- 27- Magnetic field lines starts from the north pole and end at the south pole.
- 28- Electric field lines end at the metallic surfaces, while magnetic field lines penetrate delicate surfaces.

- 29- Forces acting on objects are generally classified into contact and field forces.
- 30- Contact forces are those that act on objects upon contact, such as collision force and friction force.
- 31- The space in which the Earth's gravitational force affects material objects with an attraction force towards the Earth's center is called Earth's gravitational field.
- 32- Earth's gravitational force is expressed by Earth's gravitational field lines.
- 33- From the factors affecting the gravitational force between two objects is the mass of two objects and the distance between the centers of the two objects.
- 34- The greater the mass of the two objects, the greater the force of attraction between them.
- 35- The gravitational force decreases as the distance between the centers of the two objects increases.
- 36- Tides are most active when the moon is shaped like either new moon or full moon.
- 37- The phenomenon of tides occurs in the Bay of Fundy in Canada, and the difference between the height and low water levels can reach up to 19 meters.
- 38- Black holes are regions in the space formed due to the collapse of a massive star at the end of its life.
- 39- Black holes are characterized by immense gravity force, so that even light can't escape from them.
- 40- An example of orbital motion is the movement of moon around Earth.
- 41- Electrostatic force may be either attractive or repulsive between two charges, while gravitational forces are only attractive forces.
- 42- Mass is measured in kilogram, while weight is measured in Newton.
- 43- The weights of objects become zero in outer space, while their masses remain constant.

- 44- The Earth's gravitational field intensity decreases as we move away from the Earth's center.
- 45- An object its weight on the Earth's surface equals 60 newton, so its mass equals 6 kg, when Earth's gravitational field intensity is 10 N/kg.
- 46- An object mass on the Earth's surface equals 50 kg, so its mass on moon's surface equals 50 kg.

3) Write the scientific term:

- 1- The charges accumulated on the surfaces of objects when they lose or gain electrons. (Static electricity)
- 2- The measuring unit of electric charge. (Coulomb)
- 3- A device used to measure weak electric charges. (Coulomb meter)
- 4- The process of charging two uncharged objects by rubbing them together. (Charging by rubbing)
- 5- The arrangement of materials according to the easiness of losing electrons when they are rubbed together. (Electrostatic series)
- 6- The process of charging an uncharged object by another charged object due to their contact. (Charging by contact)
- 7- The region of space around an electric charge, in which its effect appears. (Electric field)
- 8- Imaginary lines that show the path taken by a small free moving positive charge. (Electric field lines)
- 9- A device used in detecting the electric state of an object. (Electroscope)
- 10- A system used to protect structures and buildings from lightning strikes. (Lightning Rod)
- 11- A natural stone that has the ability to attract objects made of iron. (Natural magnet or Lodestone)
- 12- Materials that are attracted to the magnet. (Magnetic materials)
- 13- Materials that are not attracted to the magnet. (Non-magnetic materials)
- 14- Similar poles repel and different poles attract. (Law of attraction and repulsion)
- 15- The force that pulls all objects downward towards the Earth's center. (Earth's gravitational force)
- 16- The unit of force measurement. (Newton)

17- The rotation of any object in space around another central object in a curved path due to the gravitational attraction force between them. (Orbital motion)

18- The amount of matter in an object. (Mass)

19- The gravitational force that Earth exerts on the object. (Weight)

4) What is meant by:

1- The mass of a ball is 20 kg.

➤ The amount of matter in the ball is 20 kg.

2- The weight of a person on Earth's surface is 500N.

➤ The gravitational force that Earth exerts on the person is 500N.

3- The gravitational force that Moon exerts on an object is 60N.

➤ The weight of the object on Moon's surface is 60N.

5) Put (√) or (x):

1- Paper scraps are attracted to an iron rod held by hand. (x)

2- The same material can be charged with either a positive or a negative charge. (√)

3- The charge on the rubbed object varies depending on the type of the rubbing material. (√)

4- Electric power lines start from the positive charge and end at the negative charge. (√)

5- When a glass rod is rubbed with a piece of silk, the force lines start from the piece of silk. (x)

6- Two ebonite rods repel each other when rubbed separately with a piece of wool. (√)

7- Both glass and wood acquire the same electric charge when each of them is rubbed separately with a piece of silk. (√)

8- Cotton always acquires positive charges when used to rub other materials. (x)

9- Electric force lines end at the surfaces of charged metal objects and don't penetrate them. (√)

10- When a piece of synthetic leather rubbed with wool is brought close to the disc of a negatively charged electroscope, the leaves divergence increases. (x)

- 11- The disc and leaves of the electroscope are made of conductive materials. (✓)
- 12- The electroscope can be charged by contact. (✓)
- 13- The density of iron filings is the greatest at the middle of the magnet. (x)
- 14- The mutual magnetic force between a magnet and a magnetic material within its field is a repulsive force. (x)
- 15- The compass needle is deflected when a magnet is brought close to it. (✓)
- 16- The magnetic field lines crowd together at north and south poles. (✓)
- 17- Friction forces are field forces, while gravitational force is contact force. (x)
- 18- Gravitational force is a mutual force between two objects, acting with equal magnitude in same direction. (x)
- 19- The rotation of electrons around the nucleus of an atom is an example of orbital motion. (✓)
- 20- The phenomenon of tides is a result of the gravitational force between the Earth and the Sun. (x)
- 21- The phenomenon of tides occurs periodically once every 24 hours. (x)
- 22- The weight of an object doesn't change from one place to another. (x)
- 23- The larger the mass of an object, the greater its weight. (✓)
- 24- The moon's gravitational pull on an object is greater than Earth's pull on it. (x)
- 25- An object weight on Earth differs from its weight on Jupiter. (✓)
- 26- An object weight at the base of a mountain is greater than its weight at the top of it. (✓)

6) Correct the underlined words:

- 1- When we rub a rod of ebonite with silk protons transferred from silk to ebonite. (electrons)
- 2- Electric force lines are real lines that do not intersect with each other. (imaginary)
- 3- Electrons are neutrally charged particles that are not deflected by the effect of an electric field. (Neutrons)
- 4- The gold leaves become diverged when the electroscope is uncharged. (charged)

- 5- The dangled metal chain discharges the accumulated electric charges on clouds. (lightning rod)
- 6- When a magnet is brought close to a piece of cobalt, a repulsive force arises between them. (an attractive)
- 7- Electric field lines are imaginary lines representing the strength of the magnetic field. (Magnetic)
- 8- Contact forces affecting certain dimension such as gravitational forces and electromagnetic forces. (Field)
- 9- The force affecting falling of an apple to the ground is the friction force. (Earth's gravitational)
- 10- The phenomenon tides occur once daily. (twice)
- 11- The phenomenon of tides can be used to generate light as one of the renewable energy sources. (electricity)
- 12- The phenomenon of black holes is used to purify the water bodies from impurities. (tides)
- 13- Friction force is the force of attraction between any object moving in space along a curved path around central object. (Gravitational)
- 14- Black holes are formed due to the collapse of a massive planet at the end of its life. (star)
- 15- The mass of an object changes from one place to another. (weight)
- 16- An object weight increases as it rises above Earth's surface. (decreases)
- 17- An object weight on the moon is equal to its weight on Earth. (less than)
- 18- If the mass of an object is 500 g, and the gravitational field intensity at a certain position is 10 N/kg, then its weight is 5000 kg. (5 N)

7) Cross out the odd word and write the scientific term of others:

- 1- Wood – Copper – Ebonite – Silk.
➤ Scientific term: Electrical non-conducting materials.
- 2- Iron – Nickel – Cobalt – Gold.
➤ Scientific term: Magnetic materials.
- 3- Magnetic needle – Bar magnet – Lodestone – Magnetic ring.
➤ Scientific term: Industrial magnets.
- 4- Friction force - Electrostatic force - Magnetic force - Gravitational force.
➤ Scientific term: Field Forces.

5- Collision force - Magnetic force - Friction force - Elasticity force.

➤ Scientific term: Contact Forces.

8) Mention the difference between (compare):

1- Electric attraction force and electric repulsion force.

Electric attraction force	Electric repulsion force
Force arises between the objects with different electric charges.	Force arises between the objects with same electric charges.

2- Charging by rubbing and charging by contact.

Charging by rubbing	Charging by contact
It is the process of charging two uncharged objects by rubbing them together.	It is the process of charging an uncharged object by another charged object due to their contact.

3- Electric field lines and magnetic field lines.

Electric field lines	Magnetic field lines
They start from the positive charge and end at the negative charge.	They start from the north pole of the magnet and end at the south pole.
They end at the surfaces of charged objects and don't penetrate them.	They are denser near the poles and can penetrate delicate surfaces.

4- Field forces and contact Forces.

Field Forces	Contact Forces
Forces have field.	Forces don't have field.
They are forces that act on objects within their field at a certain distance without contact.	They are forces that act on objects when they are in contact with each other.
Ex. Electrostatic force, Magnetic force, Gravitational force.	Ex. Electrostatic force, Magnetic force, Gravitational force.

9) Give an example for:

- | | |
|---|-----------------------|
| 1- Electrical conductor metal. | (Iron) |
| 2- Electrical insulator material. | (Ebonite) |
| 3- Matter loses electrons when rubbed with a piece of wool. | (Glass) |
| 4- Magnetic material. | (Cobalt) |
| 5- Non-magnetic material. | (Copper) |
| 6- Field Force. | (Electrostatic force) |

7- Contact Force.

(Friction force)

8- Orbital motion.

(The motion of the moon around the Earth)

10) Give reason for:

1- The electrostatic electricity is called static electricity.

- Because electrostatic charges settle on the surface of the rubbed part only of the object and don't transfer to the rest of it.

2- The attraction of paper pieces to an ebonite rod rubbed with silk.

- Because the rod gains negative electrostatic charges, giving it the ability to attract lightweight objects (as paper pieces).

3- Small paper scraps are not attracted to the copper rod when rubbed with wool.

- Because no static electric charges are formed on the rod, as copper is a conducting material, which must be insulated to prevent the leakage of electric charges.

4- The glass rod becomes positively charged when rubbed with silk.

- Because glass precedes silk in the electrostatic series, so it tends to lose electrons and becomes positively charged.

5- Touching the electroscope disc with the hand before using it.

- To ensure that it is free of any electric charge.

6- Metal chains are hanged from fuel transport vehicles and touch the ground.

- To discharge the electric charges generated by the friction of the fuel with the surface of the fuel tank, to prevent fuel combustion.

7- It is preferable to paint metals using electrostatic painting method than other methods.

- Because it coats metals with a uniform layer without wasting paint material.

8- The lightning rod has an important protective role.

- Because it discharges the accumulated electric charges on nearby clouds to the ground without causing damage to buildings and structures.

9- Nickel and cobalt are considered as magnetic materials.

- Because they are attracted to the magnet.

- 10- Aluminum and silver are non-magnetic materials.**
➤ Because they are not attracted to the magnet.
- 11- Compass box is made of copper or plastic and not of iron.**
➤ To prevent the attraction between the needle and the box material, which can affect its movement.
- 12- Iron fillings are attracted in large amounts at each pole of the magnet.**
➤ Because the magnetic force is the strongest at the poles of the magnet.
- 13- All objects fall downward to the Earth's center.**
➤ Due to the Earth's gravitational force.
- 14- There is a field of magnetic forces and no field of collision forces.**
➤ Because magnetic force is a field force which acts on objects at a distance without contact, while collision force is a contact force that acts on objects upon contact.
- 15- The occurrence of tides phenomenon in the seas and oceans.**
➤ Due to the gravitational attraction between the Moon and Earth.
- 16- The formation of black holes in the space.**
➤ Due to the collapse of a massive star at the end of its life.
- 17- Satellites do not deviate from their orbits around Earth.**
➤ Due to the Earth's gravitational force.
- 18- An object's weight on Earth's surface is always greater than its mass.**
➤ Because the weight of the object equals the product of its mass multiplied by the gravitational field intensity.
- 19- The weight of an object on the Earth's surface is greater than the weight of the same object on the Moon's surface.**
➤ Because the gravitational field intensity of the moon is $\left(\frac{1}{6}\right)$ that of Earth's gravitational field intensity.
- 20- Object's weight changes from one planet to another.**
➤ Due to the change in gravitational field intensity from one planet to another.
- 21- The object has no weight in the outer space.**
➤ Due to absence of gravity in outer space.

11) What are the results of (What happens...)?

- 1- Rub the ebonite rod with a piece of silk and bring them close to each other.**
 - The ebonite rod becomes positively charged, while the piece of silk becomes negatively charged, so they attract each other.
- 2- Bringing a glass rod close to a freely suspended ebonite rod after rubbing each of them with silk.**
 - The ebonite rod attracts the glass rod.
- 3- Rubbing a wooden rod with a piece of cotton.**
 - Cotton gains a negative charge, while wood gains a positive charge.
- 4- Touching a charged electroscope disc with your hand.**
 - The electroscope becomes uncharged and the two gold leaves become applicable.
- 5- Approaching a positively charged glass rod close to a negatively charged electroscope.**
 - The gold leaves divergence decreases.
- 6- Approaching a negatively charged ebonite rod close to a negatively charged electroscope.**
 - The gold leaves divergence increases.
- 7- Dividing a single magnet into several parts.**
 - Each part becomes a new magnet with a north and a south poles.
- 8- A magnet is brought close to a mixture of iron filings and silver.**
 - Iron fillings only are attracted to the magnet.
- 9- Dip a magnet in a box containing iron filings.**
 - Iron fillings are attracted in large amounts at each pole of the magnet.
- 10- A magnet is suspended freely from its middle.**
 - The magnet always takes a certain direction which is north and south.
- 11- Bring the south pole of a magnet closer to the south pole of another freely suspended magnet.**
 - A repulsion force arises between them.

12- The absence of gravity.

- There is no stability of objects and there is no rainfall.
- All objects will not fall towards the Earth.
- Objects weight will become zero.

13- Increase in object mass. (Relative to gravitational force between them)

- The gravitational force between them increases.

14- Decrease of the distance between the two objects.

(Relative to the gravitational force between them)

- The gravitational force between them increases.

15- Transferring an object from the moon's surface to the Earth's surface.

(Relative to its mass and its weight)

- Its mass doesn't change, while its weight increases.

12) Problems:

**1- Calculate the weight of an object its mass is 50 g at Earth's surface.
(Knowing that Earth's gravitational field intensity is 10 N/kg)**

Solution:

The mass in kilograms (kg) = $50 \div 1000 = 0.05$ kg.

Weight (w) = Mass of the object (m) x Gravitational field intensity (g)
= $0.05 \times 10 = 0.5$ N

**2- Calculate the Earth's gravitational pull on an object with a mass of 20 kg
(Knowing that Earth's gravitational field intensity is 10 N/kg)**

Solution:

The Earth's gravitational pull on an object = Weight (w)
= Mass of the object (m) x Gravitational field intensity (g)
= $20 \times 10 = 200$ N

3- An object has a mass equals 60 kg on the moon. Calculate:

- a) Its mass on Earth's surface.
- b) Its weight on Earth's surface.
- c) Its weight on moon's surface.

(Knowing that Earth's gravitational field intensity is 10 N/kg)

Solution:

Mass on the Earth = Mass on the moon = 60 kg.

$$\begin{aligned}\text{Weight on Earth's surface (w)} &= m \times g \\ &= 60 \times 10 = 600 \text{ N}\end{aligned}$$

$$\text{Weight on moon} = 600 \times \frac{1}{6} = 100 \text{ N.}$$

- 4- Calculate the mass of an object on the moon if the earth's gravitational pull on it is 980 N and Earth's gravitational field intensity is 10 N/kg.

Solution:

$$\begin{aligned}\text{Mass on the Earth (m)} &= \text{Weight (w)} \div \text{Gravitational field intensity (g)} \\ &= 980 \div 10 = 98 \text{ kg.}\end{aligned}$$

Mass on the Earth = Mass on the moon = 98 kg.

- 5- If an object weighs 20 N on the Moon and the gravitational field intensity on Mars is 3.7 N/kg. Calculate the object's weight on Mars.

(Knowing that Earth's gravitational field intensity is 10 N/kg)

Solution:

$$\begin{aligned}\text{Object's weight on Earth's surface} &= \text{Object's weight on the Moon} \times 6 \\ &= 20 \times 6 = 120 \text{ N}\end{aligned}$$

$$\begin{aligned}\text{Mass on the Earth (m)} &= \text{Weight (w)} \div \text{Gravitational field intensity (g)} \\ &= 120 \div 10 = 12 \text{ kg.}\end{aligned}$$

Mass on the Earth = Mass on Mars = 12 kg.

Object's weight on Mars =

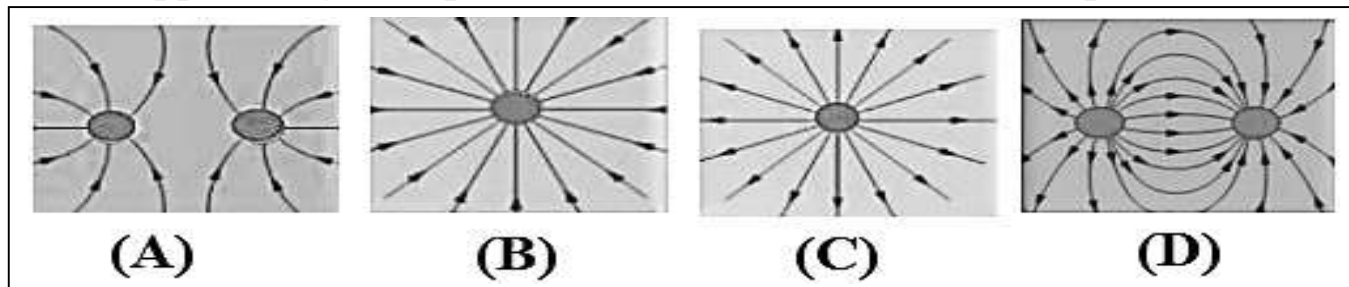
$$\begin{aligned}&\text{Mass of the object (m)} \times \text{Gravitational field intensity on Mars} \\ &= 12 \times 3.7 = 44.4 \text{ N}\end{aligned}$$

- 13) **State one importance for each of the following:**

- 1- Coulomb meter: is used to measure weak electric charges.
- 2- Lightning rod: is a system used to protect structures and buildings from lightning strikes.
- 3- Electrostatic plating: is used in metal plating with uniform layer of paint and reduces paint waste.
- 4- Gravitational force: it is responsible for:
 - Stability of the objects, rainfall and falling of objects towards the Earth.
 - The occurrence of tidal phenomenon and black holes phenomenon.

14) Study the following figures then answer:

1- The opposite figure represents the electric force lines, complete:



a) Figure (A) represents the electric force lines for two similar charges, while figure (D) represents the electric force lines for two different charges.

b) Figure (C) represents the lines of electric force for a positive charge, while figure (B) represents the lines of electric force for a negative charge.

2- The opposite figure represents one of the devices:

a) What is the name of the device?

➤ **Electroscope.**

b) It is used for detecting the electric state of an object and detecting the type of charge.

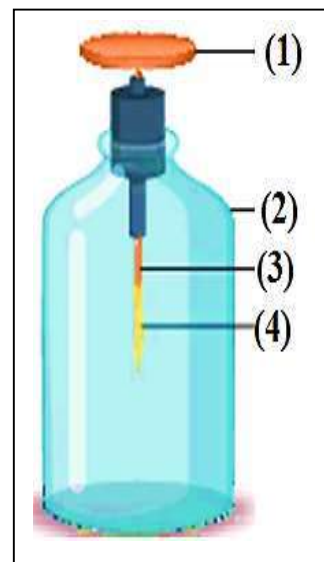
c) Write the labels in the opposite drawing:

(1) Copper disc.

(2) Glass container.

(3) Copper rod.

(4) Two gold leaves.



d) In the opposite drawing the device is (charged – uncharged).

e) What happens if a charged object touches to the disc of this device?

➤ **The two gold leaves of the electroscope diverge.**

3- The opposite figure represents one of the devices:

a) What is the name of the device?

➤ The compass.

b) It is used to determine the Earth's four main geographical directions.

c) The box of this device made up of copper or plastic.



4- The opposite figure represents one of the devices:

a) What is the name of the device?

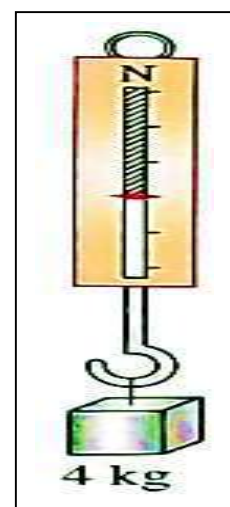
➤ Spring balance (Newton meter).

b) It is used to measure the weight of objects.

c) From the opposite figure, calculate the weight of the cube.

(Earth's gravitational field intensity is 10 N/kg)

➤ $W = m \times g = 4 \times 10 = 40 \text{ N}.$



حمل الآن

مجاناً وحصرياً

المراجعة رقم (4)

اختبار شهر نوفمبر



PREP .1

Question 1

Choose the correct answer:

1. Which of the following materials gains electrons when rubbed with a piece of wool?

- a. Wood. b. Glass. c. Silk. d. Paper.

2. All the following materials precede cotton in the electrostatic series, except.....

- a. silk. b. glass. c. ebonite. d. wool.

3. All the following living organisms, their genetic material surrounded by a nuclear membrane, except.....

- a. bacteria. b. *Euglena*. c. yeast fungus. d. bean plant.

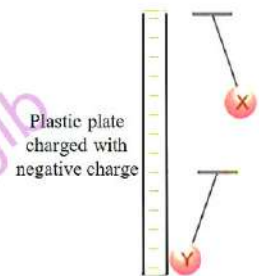
4. All the following are characteristics of *Paramecium*, except it is.....

- a. a unicellular prokaryote. b. a unicellular eukaryote.
c. a protozoan. d. a microscopic organism.

5. From the opposite figure :

Which of the following represents the charge of each of the two balls (X), (Y)?

- a. (X): Positive, (Y): Positive.
b. (X): Positive, (Y): Negative.
c. (X): Negative, (Y): Negative.
d. (X): Negative, (Y): Positive.



6. Which of the following is found in animal, plant and bacterial cells?

- a. Centrosome. b. Ribosomes. c. Nucleus. d. Chloroplasts.

7. All the following are present in bacterial cell, except.....

- a. ribosomes. b. Golgi apparatus.
c. plasma membrane. d. cytoplasm.

8. The phenomenon of tides occurs.....daily.

- a. once b. twice c. three times d. four times

9. If the gravitational field intensity on the Moon's surface is 1.6 N/kg, then the force of gravity on a rocket with a mass of 1000 kg at the Moon's surface is

- a Zero. b 1600 N c. 10000 N d. 16000 N

10. A rod of ebonite was rubbed with a piece of wool.

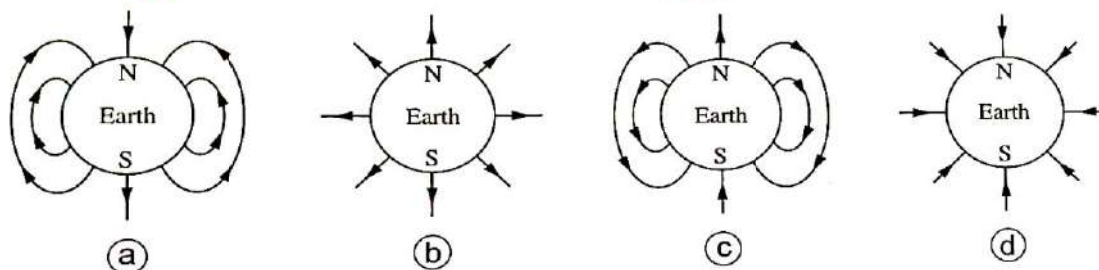
Which of the following describes the charge on the ebonite rod and the wool and the force between them, respectively?

- a. Positive / Positive / Repulsion.
b. Positive / Negative / Attraction.
c. Negative / Positive / Attraction.
d. Negative / Negative / Repulsion.

11. Which of the following forces is considered a field force?

- a. Gravitational forces and magnetic forces.
b. Electrostatic forces and frictional forces.
c. Elasticity forces and magnetic forces.
d. Frictional forces and collision forces.

12. (Which of the following represents Earth's gravitational field lines?



13. The cell wall is found in.....

- a. plant cell only. b. animal cell only.
c. plant and bacterial cells. d. animal and bacterial cells.

14. When a carbon rod is rubbed with dry silk, no electrostatic charge is generated on the carbon rod. What is the reason for this?

- a. Carbon precedes silk in the electrostatic series.
b. Silk precedes carbon in the electrostatic series.
c. Silk is a nonconducting material.
d. The carbon rod is not insulated.

15. Both plant and animal cells are characterized by the presence of.....

- a. plasma membrane and centrosome.
- b. plasma membrane and cytoplasm.
- c. cell wall and nucleus.
- d. cell wall and cytoplasm.

16. Stem cells studies can assist in all the following, except.....

- a. increasing the understanding of how diseases occur.
- b. generating healthy cells to replace cells infected by disease.
- c. determining the shape of stem cells.
- d. testing new drugs before using them.

17. What is the charge of the electroscope shown in the opposite figure?

- a. Positive charge.
- b. Negative charge.
- c. Neutral charge.
- d. Unknown charge.



18. If a rod of ebonite is brought close to the disc of an electroscope charged with a certain charge and the divergence of the leaves decreases, this means that the rod.....

- a. discharged its charge to the electroscope.
- b. is not charged.
- c. is charged with the same charge as the electroscope.
- d. is charged with a charge opposite to that of the electroscope.

19. All the following are industrial magnets, except.....

- a. lodestone.
- b. horse shoe magnet.
- c. bar magnet.
- d. magnetic needle.

20. You have two objects, the mass of the first is 5 kg and the mass of the second is 20 kg Which of the following describes the attraction forces between the two objects?

- a. The force of attraction of the first object to the second is greater.
- b. The force of attraction of the second object to the first is greater.
- c. Both objects attract each other with the same force.
- d. There is no attraction force between the two objects.

21. What is the force that causes a ball to fall from a high position to Earth's surface?

- a. Gravity b. Magnetism c. Friction d. Collision

22. Which of the following forces are field forces?

- a. Magnetic and electrostatic forces. b. Elasticity and collision forces.
c. Gravitational and friction forces. d. Magnetic and elasticity forces.

23. Which of the following expresses what happens to the two leaves of a negatively charged electroscope when a piece of synthetic leather rubbed with wool is brought close to its disc?

- a. The leaves return applicable.
b. The leaves divergence increases.
c. The leaves divergence decreases.
d. The leaves divergence is not affected.

24. The gravitational force between two objects decreases as.....

- a. their masses decrease and the distance between their centers increases.
b. their masses increase and the distance between their centers decreases.
c. their masses increase and the distance between their centers increases.
d. their masses decrease and the distance between their centers decreases.

25. The phenomenon of tides is a result of the gravitational force between.....

- a. the Earth and the moon. b. the Earth and the Sun.
c. the Sun and the moon. d. the Earth and water.

26. The heart is considered.....

- a. a cell. b. an organ. c. a tissue. d. a system.

27. Which of the following scientific facts applies to the field forces of Li atom?

- a. There are repulsive electrostatic forces between the nucleus and the electron
b. There are attractive electrostatic forces among the three electrons.
c. There are gravitational forces between the nucleus and the electrons, which are very weak.
d. There are gravitational forces between the nucleus and the electrons, which are very strong.

28. Which of the following choices describes the gravitational force and the electrostatic forces between two non-contact material objects, both charged with positive charges?

Choices	Gravitational force	Electrostatic forces
a.	Attraction	Attraction
b.	Repulsion	Repulsion
c.	Repulsion	Attraction
d.	Attraction	Repulsion

29. What happens when the gravitational field intensity acting on an object increases?

- a. Its weight increases and its mass decreases.
- b. Its weight decreases and its mass increases.
- c. Its weight increases only.
- d. Its weight decreases only.

30. The gravitational field intensity of the moon equal.....

- a. $\frac{1}{6}$ of the gravitational field intensity of the Sun.
- b. $\frac{1}{6}$ of the gravitational field intensity of the Earth.
- c. six times the gravitational field intensity of the Sun.
- d. six times the gravitational field intensity of the Earth.

31. An object weight is 320 N at the surface of a planet and weight is 800 N at Earth's surface. What is the gravitational field intensity of this planet?

(knowing that the Earth's gravitational field intensity = 10 N/kg)

- a. 4N/kg
- b. 10 N/kg
- c. 32 N/kg
- d. 480 N/kg

32. The body of a lion consists of a group of.....

- a. systems.
- b. organs.
- c. tissues.
- d. cells.

33. The building units that form an organ are called.....

- a. systems.
- b. tissues.
- c. cells.
- d. organelles.

34. Amoeba is distinguished from bacteria in that it is.....

- a. eukaryote.
- b. unicellular.
- c. can be seen under a light microscope.
- d. unspecialized.

- 35. Black holes in the space are usually formed when.....**
- a. a massive star collapses at the end of its life.
 - b. a planet expands at the beginning of its life.
 - c. a massive star freezes at the end of its life.
 - d. a planet collapses at the end of its life.
- 36. If an object's mass at Earth's surface is 10 kg, then its mass in outer space is.....**
- a. 0
 - b. 10kg
 - c. 100 kg
 - d. 0.1 kg
- 37. The weight of an object on Earth's surface is always.....**
- a. less than its mass.
 - b. equal to its mass.
 - c. greater than its mass.
 - d. zero.
- 38. The building units that form a tissue are called.....**
- a. organelles.
 - b. systems.
 - c. cells.
 - d. organs.
- 39. A balloon hanged by a nylon string repels a rod of ebonite, because the ebonite rod.....**
- a. carries a charge opposite to that of the balloon.
 - b. carries the same charge as the balloon.
 - c. is charged, and the balloon is uncharged.
 - d. is uncharged, and the balloon is charged.
- 40. The magnitude of static electric charge is measured by a device called.....**
- a. Ammeter.
 - b. Coulomb meter.
 - c. Voltmeter.
 - d. Ohmmeter.
- 41. Which of the following occurs when a glass rod is rubbed with a piece of silk?**
- a. The force lines start from the glass rod.
 - b. The force lines end at the glass rod.
 - c. The piece of silk is charged positively.
 - d. The force lines start from the piece of silk.
- 42. All the following are classified as microorganisms, except.**
- a. Amoeba.
 - b. Euglena.
 - c. Paramecium.
 - d. Bread mold fungus.
- 43. All the following are electrical nonconducting materials, except..**
- a. wood.
 - b. carbon.
 - c. ebonite.
 - d. silk.

44. When a wooden ruler is rubbed with a piece of cotton, an electric force is generated between them.

What is the type of charge formed on the ruler, and what type of electric force exists between them?

- a. Positive /Repulsion.
- b. Negative /Repulsion.
- c. Positive/Attraction.
- d. Negative/Attraction.

45. Among the electrical conductors is.....

- a. a glass rod.
- b. a wooden ruler.
- c. a plastic straw.
- d. a metal nail.

46. A cell that performs all vital processes is described as.....

- a. differentiated.
- b. undifferentiated.
- c. specialized.
- d. unspecialized.

47. All the following organisms have specialized cells, except.....

- a. beans.
- b. yeast.
- c. corn.
- d. elephant.

48. All the following from characteristics of prokaryotes, except ..

- a. most are unicellular.
- b. organisms simple in their structure.
- c. relatively small in size.
- d. their genetic material is not surrounded by a nuclear membrane.

49. Which of the following living organisms lack most organelles in their cells?

- a. Amoeba.
- b. Euglena.
- c. Paramecium.
- d. Bacteria.

50. Yeast fungus and bread mold fungus share the characteristic that both are.....

- a. eukaryote.
- b. unicellular.
- c. prokaryote.
- d. relatively large in size.

51. What is the ratio of an object's mass on the surface of the Moon to its mass on the surface of the Earth?

- a. 1:6
- b. 6:1
- c. 1:1
- d. 6:5

Question 2

Write the scientific term of each of the following

1. The building units that are directly above tissues.
2. Materials that are attracted to a magnet.

3. The order of materials according to the easiness of losing electrons when they are rubbed together.
4. Subatomic particles which are deflected towards the negative plate when they pass through an electric field.
5. The region of space around an electric charge, in which its effect appears.
6. Imaginary lines that show the path taken by a small free-moving positive charge placed in the electric field.
7. The geographical pole of the Earth that the north pole of a freely-suspended magnet points to.
8. A device used to determine if an object is electrically charged and the type of charge on them.
9. The process of charging an uncharged object by another charged object due to their contact.
10. A natural rock that has the ability to attract objects made of iron.
11. Materials that are not attracted to a magnet.
12. A device used to examine microorganisms.
13. Microorganisms whose genetic material is not surrounded by a nuclear membrane.
14. Imaginary lines that represent the force of the magnetic field.
15. The mutual magnetic force between a magnet and a magnetic material within its field.
16. Forces that act on objects when they are in contact with each other.
17. An old tool used to determine the four main geographical directions of the Earth
18. Living organisms with more complex bodies and whose genetic material is surrounded by a nuclear membrane.
19. Forces that act on objects within their field at a certain distance without contact.
20. The force that pulls (attracts) all objects downward towards the Earth's center.
21. The gravitational force that Earth exerts on the object.
22. The smallest structural unit in the human body.
23. The charges formed on the object that loses electrons when rubbed.

24. The space in which the Earth's gravitational force affects material objects with an attraction force towards the Earth's center.
25. The classification of living organisms into groups based on their similarities and differences.
26. The accumulated charges on the surfaces of objects when they lose or gain electrons.
27. The measuring unit of electric charge
28. Microorganisms whose bodies are made of a single, unspecialized cell and cannot be seen by the naked eye.
29. A natural phenomenon that occurs due to the gravitational force between the moon and the Earth.
30. A cell organelle that is larger in size in a plant cell compared to animal cell.
31. Regions in the space with immense gravity, So that even light cannot escape from them.
32. The rotation of any object in space around another central object in a curved path due to the gravitational attraction force between them.
33. The amount of matter an object contains.
34. Living organisms whose bodies are formed of differentiated and specialized cells.
35. Undifferentiated cells with the ability to continuously renew themselves in human.
36. Like magnetic poles repel, and unlike magnetic poles attract.
37. Cell organelles shared by both prokaryotic and eukaryotic cells.
38. A cellular structure found only in both bacterial and plant cells.
39. Unique organelles found in plant cells only.
40. A cell organelle that distinguishes an animal cells from a plant cell.

Question 3

Complete the following sentences:

1. The living organisms whose cells lack most organelles are called.....while the living organisms whose cells containing many organelles are called.....
2. Eukaryotes can be either.....or.....

3. In the electrostatic series,and.....precede synthetic leather, while..... and.....follow cotton.
4. When both silk and paper are rubbed with a piece of cotton, silk acquires a..... electric charge, while paper acquires a.....electric charge.
5. Mass is measured in.....while weight is measured in.....
6. In electrostatic plating, the paint spray is charged with a.....charge is sprayed on the object to be painted, which is charged with a.....electric charge.
7. A life application of the attraction between the opposite electric charges is.....
8. Electric force lines start from the.....charge and end at the..... charge.
9. The electroscope consists of a metal disc, a glass container, a.....rod and two.....leaves.
10. Forensic and criminal investigation experts use..... filings and a.....brush to reveal the unclear fingerprints.
11. If the leaves of an electroscope do not diverge when an object touches its disc, then this indicates that the object is.....
12. In a lightning rod system, its lower end is fixed in theand its upper end.....
13. When a magnet is brought close to pieces of nickel and aluminum, is attracted to the magnet, while.....is not attracted to it.
14. Metallic materials are divided according to their attraction to magnets into..... materials and.....materials.
15. When a magnet is suspended freely, its south pole points to the geographicalpole of the Earth.
16. An.....force arises between the north pole of a magnet and the south pole of another magnet, while a.....force arises between the south pole of a magnet and the south pole of another magnet.
17. Magnetic field lines start from thepole and end at thepole.

- 18..... field lines end at the metallic surfaces, while field lines penetrate delicate surfaces.
- 19.When two positive charges are brought close to each other, a force of arises between them, while when the north pole of one magnet is brought close to the south pole of another magnet, occurs.
- 20.Iron is an electrically material, while glass is an electrically material.
- 21.Weak electric charges are measured by and the measuring unit is
- 22.The scientist discovered that all material objects in the universe attract each other, and in recognition of his contributions, the unit of force was named after him.
- 23.From cell organelles found in bacterial cells is, while is a cell organelle found only in plant cells.
- 24.When a magnet is suspended freely, its south pole points to the geographical pole of the Earth.
- 25.An force arises between the north pole of a magnet and the south pole of another magnet, while a force arises between the south pole of a magnet and the south pole of another magnet.
- 26.The gravitational force between two objects acts on each of the two objects by equal in but in directions.
- 27.Tides are at their peak when the moon is or
- 28.Living organisms can be classified based on structure of the nucleus into and
- 29.The weakest field force in any atom is the gravitational force between and
- 30.The weights of objects become zero in, while their remains constant.
- 31.The cell is the basic unit of and in a living organism.
- 32.Tides are used to generate as a energy source.

33. From the vital processes necessary for life continuation are,
..... and
34. The genetic material of prokaryotes is found in and is not
surrounded by
35. In mushroom fungus, the genetic material is surrounded by
which separates it from
36. Bacteria causing tonsillitis are classified as while a hedgehog is
classified as according to their nuclear structure.
37. from unicellular fungi while and are examples of
multicellular fungi.

Question 4

Correct the underlined words:

1. If an astronaut travels from the Earth's surface to a point four times
the Earth's radius above the surface, his mass increases four times.
2. The electric charge on an ebonite rod can be measured using an
electroscope.
3. Gravitational force between two spherical objects acts equally on
both of them in the same direction.
4. The compass box is made of iron to avoid influencing the movement
of the magnetic needle.
5. Friction forces act on objects at a distance.
6. Scientist Coulomb discovered that all physical objects in the universe
attract each other.
7. An object's weight becomes zero on the surface of the Moon.
8. The ratio between an object's weight on Earth to its weight on
the Moon is 1:1
9. The area surrounding an electric charge, where its effect appears,
is called electric field lines.
10. The divergence between the two leaves of a positively charged
electroscope decreases when a rod of wood rubbed with wool is
brought close to the electroscope disc.

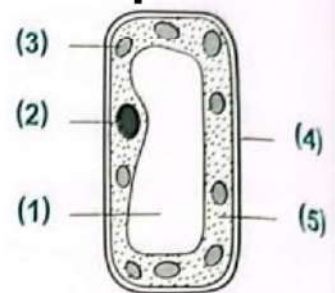
11. The two leaves of the electroscope are made of silk.
12. The electroscope works to discharge accumulated electric charges from clouds

Question 5

- a) Calculate the weight of an object its mass is 50 g at Earth's surface. (Knowing that Earth's gravitational field intensity is 10 N/kg)
- b) Calculate the Earth's gravitational pull on an object with a mass of 20 kg (Knowing that Earth's gravitational field intensity is 10 N/kg)
- c) An object has a mass equals 60 kg on the moon. Calculate its weight on:
 1. Earth's surface
 2. The moon's surface.
 (Knowing that Earth's gravitational field intensity is 10 N/kg).
- d) If the gravitational field intensity at a certain position is 10 N/kg, Calculate the mass of an object weighing 490 N at Earth's surface.
- e) Calculate the mass of an object on the moon if the earth's gravitational pull on it is 980 N and Earth's gravitational field intensity is 10 N/kg
- f) If an object weighs 20 N on the Moon and the gravitational field intensity on Mars is 3.7 N/kg, Calculate the object's weight on Mars. (Knowing that Earth's gravitational field intensity is 10 N/kg)

g) The opposite figure represents the structure of a plant cell. Write the number indicating:

- (1) A structure that is unique to the plant cell.
- (2) A structure that is shared with bacterial cell.
- (3) A structure that is shared with both animal and bacterial cells.
- (4) A structure whose size differs compared to that of the animal cell.



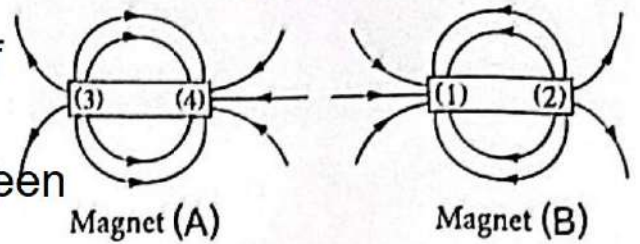
h) Give an example of each of the following:

1. A unicellular prokaryote
2. A unicellular eukaryote.
3. A multicellular eukaryote
4. A unicellular eukaryotic fungus.
5. A multicellular eukaryotic fungus.

i) The opposite figure shows the magnetic field lines of two adjacent magnets (A) and (B) :

(1) Determine the type of the poles of the magnets (A) and (B).

(2) Determine the type of force between the two magnets.

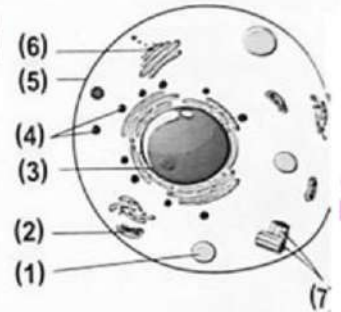


j) The opposite figure represents the structure of an animal cell. Write the number indicating:

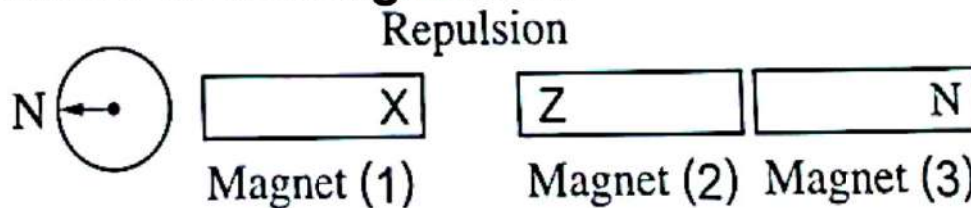
(1) A structure unique to the animal cell.

(2) Organelles shared with both plant and bacterial cells.

(3) A structure absent in bacterial cells



k) The following figure shows 3 bars magnets and a compass all placed in a straight line:



(1) Identify the type of the poles (X),(Z).

(2) What is the type of the force between the facing poles of magnet (2) and magnet(3)?

l) Classify the following living organisms based on what you have studied:

1. Paramecium

2. Bread mold fungus.

3. Lily plant.

4. Dog

6. Human.

Question 7

Give reasons for:

1. Fuel transport vehicles have metal chain that dangle to touch the ground

To discharge the electric charges generated by the friction of the fuel with the surface of the fuel tank, to prevent fuel combustion.

2. Stem cells can produce more of themselves.

Because they have the ability to renew themselves through division.

3. Electrostatic plating is preferred for painting metals.

Because it makes the paint layer uniform on the surface and reduces the waste of paint material.

4. An object's weight on the Moon is less than its weight on Earth.

Because the Moon's gravitational field intensity is $\frac{1}{6}$ that of Earth's gravitational field intensity.

5. An object's weight changes from one planet to another.

Due to the variation in gravitational field intensity from one planet to another.

6. Human cells are both differentiated and specialized.

They are differentiated because they vary in their shape and structure, and specialized because each group of cells performs specific vital processes.

7. Bacteria are classified as prokaryotes.

Because the genetic material in its cells is founded in the cytoplasm and not surrounded by a nuclear membrane.

8. Touching the electroscope disc with the hand before using it.

To ensure it has no electrical charge.

9. The divergence of the leaves of the negatively charged electroscope decreases when a wooden rod rubbed with brought close to the disc.

Because rubbing the wooden rod with wool gives the wood a positive charge, which is opposite to the charge of the electroscope, causing its leaves to come closer to each other.

10. The lightning rod has an important protective role.

It discharges the accumulated charges on the nearby clouds to the ground without causing damage.

11. The density of iron filings increases at the poles of the magnet.

Because the magnetic forces are the strongest at the poles of the magnet.

12. A magnet always takes a certain direction when it is suspended freely.

Because the Earth acts as a giant magnet that affects the freely suspended magnet, the north pole (N) of the magnet points to the geographic north pole of the Earth, while the south pole (S) of the magnet points to the geographic south pole of the Earth.

13. The magnetic needle of a compass is placed inside a copper box

To prevent the attraction between the magnetic needle and the box material, which could affect on its movement.

14. Electric field lines and magnetic field lines are similar

Because both are imaginary lines that do not intersect each other.

15. Collision forces are contact forces, while Earth's gravitational force is a field force.

Because collision forces act on the objects when they come into contact with each other and do not have a field, while Earth's gravitational force affects objects that are within its field at a distance without contact.

16. You feel a slight electric shock when you touch metal handle walking barefoot on the carpet.

Because when the handle is touched, the charge generated on the body due to friction with the carpet is discharged.

17. The attraction of paper pieces to an ebonite rod rubbed with wool.

Because the rod gains electrostatic charges, giving it the ability to attract lightweight objects (as paper scraps).

18. When an ebonite rod is rubbed with cotton, cotton acquires a positive charge, while ebonite acquires a negative charge.

Because cotton precedes ebonite in the electrostatic series, so it tends to lose electrons and becomes positively charged, while ebonite gains these electrons and becomes negatively charged.

19. Neutrons are not deflected when they pass through an electric field.

Because neutrons are electrically neutral.

20. Two pieces of silk repel each other after each of them is rubbed separately with cotton.

Because rubbing silk with cotton gives the silk a positive charge, and objects with the same charge repel each other.

21. The state of the sea differs when the moon is in the crescent phase compared to its new moon and full moon state during phases.

Because tides are at their peak when the Moon is full or new.

22. The formation of black holes in the space.

Due to the collapse of a massive star at the end of its life.

23. The concept of mass differs from the concept of weight.

Because mass is the amount of matter that an object contains, while weight is the gravitational force that earth exerts on the object.

Answers

Question 1

1) d	2) c	3) a	4) a	5) d	6) b	7) b	8) b	9) b
10) c	11) a	12) d	13) c	14) d	15) b	16) c	17) c	18) d
19) a	20) c	21) a	22) a	23) c	24) a	25) a	26) b	27) c
28) d	29) c	30) b	31) a	32) a	33) b	34) a	35) a	36) b
37) c	38) c	39) b	40) b	41) a	42) d	43) b	44) C	45) d
46) d	47) b	48) a	49) d	50) a	51) c			

Question 2 Write the scientific term of each of the following

- | | | |
|--------------------------|---------------------------------|---|
| 1. Organ | 15. Attractive force | 29. Tides |
| 2. Magnetic material | 16. Contact forces | 30. Vacuole |
| 3. Electrostatic series | 17. Compass | 31. Black holes |
| 4. Proton | 18. Eukaryotic | 32. Orbital motion |
| 5. Electric field | 19. Field forces | 33. Mass |
| 6. Electric field lines | 20. Gravitational force | 34. Multicellular |
| 7. Geographic North pole | 21. Weight | 35. Stem cell |
| 8. Electroscope | 22. The cell | 36. The law of attraction and repulsion |
| 9. Charging by contact | 23. Positive charge | 37. Ribosomes |
| 10. Lodestone | 24. Earth's gravitational field | 38. Cell wall |
| 11. Nonmagnetic material | 25. Classification | 39. Chloroplast |
| 12. Microscope | 26. Static electricity | 40. Centrosome |
| 13. Prokaryotic | 27. Coulomb | |
| 14. Magnetic field lines | 28. Unicellular | |

Question 3 Complete the following sentences:

- | | |
|-----------------------------------|--------------------------------------|
| 1. Prokaryotic – eukaryotic | 18. Electric – magnetic |
| 2. Unicellular – multicellular | 19. Repulsion – attractive force |
| 3. Glass – wood – paper – ebonite | 20. Conducting – non-conducting |
| 4. Positive – negative | 21. Coulomb meter – coulomb |
| 5. Kg – Newton | 22. Newton – force |
| 6. Positive – negative | 23. Ribosomes – chloroplast |
| 7. Electrostatic plating | 24. North |
| 8. Positive – negative | 25. Attractive – repulsive |
| 9. Copper – gold | 26. Magnitude – direction |
| 10. Iron – magnetic | 27. New moon – full moon |
| 11. Uncharged | 28. Prokaryotic – eukaryotic |
| 12. The ground – pointed | 29. Nucleus – electrons |
| 13. Nickel – aluminium | 30. Outer space – mass |
| 14. Liver – intestinal – muscle | 31. Structure – function |
| 15. Unicellular – multicellular | 32. Electricity – renewable |
| 16. Unicellular – multicellular | 33. Nutrition – growth – respiration |
| 17. North – south | 34. Cytoplasm – nuclear membrane |

35. Nuclear membrane – cytoplasm

36. Prokaryotic – eukaryotic

37. Yeast – bread mold fungus –
mushroom fungus

Question 4 Correct the underlined words:

1. Doesn't change

2. Coulombmeter

3. Opposite direction

4. Copper / plastic

5. Magnetic (any field force)

6. Newton

7. The outer space

8. 6:1

9. Electric field

10. Ebonite

11. Gold

12. Lightning rod

Question 5

a) Mass in kilograms (kg) = 0.05 kg

Weight (W) = Mass (m) × Gravitational field intensity (g)

= $0.05 \times 10 = 0.5 \text{ N}$

b) Earth's gravitational force on the object = $m \times g$

= $20 \times 10 = 200 \text{ N}$

c) 1. Object's weight on Earth's surface = $60 \times 10 = 600 \text{ N}$

2. Object's weight on the Moon = $(1/6) \times 600 = 100 \text{ N}$

d) Mass (m) = $490 / 10 = 49 \text{ kg}$

e) Object's mass on Earth's surface = $980 / 10 = 98 \text{ kg}$

Object's mass on Earth = Object's mass on Moon = **98 kg**

f) Object's weight on Earth = Object's weight on Moon × 6

= $20 \times 6 = 120 \text{ N}$

Object's mass = 12 kg

Object's weight on Mars = $12 \times 3.7 = 44.4 \text{ N}$

g) 1.3 2. 4,5 3. 5 4. 1

h) 1. Bacteria 2. Ameba 3. Bread mold fungus / lion 4. Yeast fungus

5. Bread mold fungus / mushroom

i) 1. (2,3) north while (1,4) south

1. Repulsive force

j) 1. 7 2. 4 3. 1,2,3,6,7

k) 1. X, z south poles 2. Attractive force

l) 1. Unicellular eukaryotic

2. Multicellular eukaryotic

3. Multicellular eukaryotic

4. Multicellular eukaryotic

5. Unicellular prokaryotic

6. Multicellular eukaryotic

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9

